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DOCUMENT-IDENTIFIER: US 6013622 A
TITLE: Method of regulating appetite and metabolism

BSPR:
The present invention relates to weight control in animals by regulating both appetite and metabolism. More particularly, the present invention relates to weight control in humans and other animals using a diet with reduced calories, reduced or no fat, and a controlled amount of protein in combination with supplemental dietary amino acids to control appetite and modulate the effects of an altered metabolism during dieting.

BSPR:
Growth hormone releasing factor (GRF), also called growth hormone releasing hormone (GHRH), is a 44 amino acid peptide of the glucagon-VIP-PHI family and is present in high concentration in the hypothalamus, particularly in the arcuate nucleus and medium eminence. GRF is the primary stimulatory factor controlling synthesis and secretion of pituitary growth hormone (GH), a critical regulatory hormone of metabolic homeostasis controlling breakdown of fat (lipolysis) and synthesis of protein. Thus a normal level of GRF is required for appropriate levels of GH to maintain muscle mass while promoting lipolysis (Berelowitz et al. (1992), supra).

BSPR:
The relationship between hypothalamic levels of GRF and food deprivation is the opposite of that observed with NPY. Specifically, levels of GRF are reduced in the hypothalamus following food deprivation (White et al., "Localization of prepro-growth hormone releasing factor mRNA in rat brain and regulation of its content by food deprivation and experimental diabetes," Molec. Cell. Neurosci., 1:183-192 (1990); Bruno et al., "Influence of food deprivation in the rat on hypothalamic expression of growth hormone-releasing factor and somatostatin," Endocrinology, 127:2111-2116 (1990)). Moreover, expression of GRF is also reduced in animals made obese by ingestion of a high-fat diet compared to GRF expression in normal non-obese animals fed a normal diet (Berelowitz et al. (1992), supra).

BSPR:
The reduction in GRF levels in food-deprived rats has been attributed to a lack of dietary protein (Bruno et al., "Regulation of rat hypothalamic prepro-growth hormone-releasing factor messenger ribonucleic acid by dietary protein," Endocrinology, 129:1226-1232 (1991)), which reduction is reversed in part upon supplementation of the diet with the amino acid histidine (Bruno et al., "Regulation of hypothalamic preprogrowth hormone-releasing factor messenger ribonucleic acid expression in food-deprived rats: A role for histaminergic neurotransmission," Endocrinology, 133:1377-1381 (1993)).

BSPR:
Accordingly, one aspect of the invention involves a method of reducing an animal's drive to eat comprising administering to the animal a diet comprising a lower amount of calories and protein than in a preadministation diet prior to administering the lower calorie, lower protein diet, and supplementing the diet with an appetite-reducing amount of tryptophan sufficient to reduce the animal's level of neuropeptide Y compared to a pre-administration level of neuropeptide Y.

BSPR:
Another aspect of the invention relates to a method of weight control in an animal comprising administering to the animal a diet comprising a lower amount of

calories and protein than in a preadministation diet prior to administering the lower calorie, lower protein diet, and supplementing the diet with an appetite-reducing amount of tryptophan sufficient to reduce the animal's level of neuropeptide Y compared to a pre-administration level of neuropeptide Y.

BSPR:
Another aspect of the invention relates to a method of stabilizing an animal's metabolic rate comprising administering to the animal a diet comprising a lower amount of calories and protein than in a preadministation diet prior to administering the lower calorie, lower protein diet, and supplementing the diet with an amount of histidine sufficient to elicit an increase of a metabolic rate-stabilizing amount of growth hormone releasing factor in the animal to a level compared to a pre-administration level of growth hormone releasing factor.

BSPR:
Still another aspect of this invention relates to a method of weight control in an animal comprising administering to the animal a diet comprising a lower amount of calories and protein than in a preadministation diet prior to administering the lower calorie, lower protein diet, and supplementing the diet with an amount of histidine sufficient to elicit an increase of a metabolic rate-stabilizing amount of growth hormone releasing factor in the animal compared to a pre-administration level of growth hormone releasing factor.

BSPR:
Yet another aspect of this invention relates to a method of reducing an animal's drive to eat and increasing the animal's metabolic rate comprising administering to the animal a diet comprising a lower amount of calories and protein than in a preadministation diet prior to administering the lower calorie, lower protein diet, and supplementing the diet with an appetite-reducing amount of tryptophan sufficient to reduce the animal's level of neuropeptide Y compared to a pre-administration level of neuropeptide Y and with an amount of histidine sufficient to elicit an increase of a metabolic rate-stabilizing amount of growth hormone releasing factor in the animal compared to a pre-administration level of growth hormone releasing factor.

BSPR:
Another aspect of the present invention relates to a method of weight control in an animal comprising administering to the animal a diet comprising a lower amount of calories and protein than in a preadministation diet prior to administering the lower calorie, lower protein diet, and supplementing the diet with an appetite-reducing amount of tryptophan sufficient to reduce the animal's level of neuropeptide Y compared to a pre-administration level of neuropeptide Y and with an amount of histidine sufficient to elicit an increase of a metabolic rate-stabilizing amount of growth hormone releasing factor in the animal compared to a pre-administration level of growth hormone releasing factor.

BSPR:
In addition to the foregoing methods, the present invention is directed to compositions for controlling weight, especially in humans. Accordingly, this invention also relates to a human food composition wherein the composition comprises a daily diet of less than about 2,400 calories, about 10 grams (g) to about 540 g of protein and about 5 mg to about 125 mg of tryptophan per g of protein.

BSPR:
This invention also relates to a human food composition wherein the composition comprises a daily diet of less than about 2,400 calories, about 10 g to about 36 g of protein and about 10 mg to about 270 mg of histidine per g of protein.

BSPR:
This invention further relates to a human food composition wherein the composition comprises a daily diet of less than about 2,400 calories, about 10 g to about 36 g of protein, about 5 mg to about 125 mg of tryptophan per g of protein and about 10 mg to about 270 mg of histidine per g of protein.

DRPR:
FIG. 3 is a histogram illustrating the relative density of hypothalamic preproNPY mRNA with respect to selective nutrient refeeding following food deprivation compared to freely fed control, food deprived and normal refed rats.

Abbreviations and symbols are the same as those used in FIGS. 1 and 2, and NRF, normal refeed; FFRF, fat-free refed; PFRF, protein-free refed; CFRF, carbohydrate-free refed.

DRPR:
FIG. 4 is a histogram illustrating the relative density of hypothalamic preproNPY mRNA with respect to graded percentages of protein refeeding following food deprivation compared to freely fed control rats and food-deprived rats. Abbreviations and symbols are the same as those used in FIGS. 1-3, and % PRF, % protein refed.

DRPR:
FIG. 5 is a histogram showing the relative density of hypothalamic preproNPY mRNA with respect to control, freely fed and food-deprived rats comparing different types of refeed diets. Abbreviations and symbols are the same as those used in FIGS. 1-4, and Tyr, refed protein-free food supplemented with tyrosine; Trp, refed protein-free food supplemented with tryptophan; GA, refed protein-free food supplemented with glutamic acid; His, refed protein-free food supplemented with histidine.

DRPR:
FIG. 6 is a graph illustrating the change in cumulative body weight of obese rats freely fed with diets LP(-) or LP(+) over a 7-week period. LP(-), low protein diet supplemented with control amino acids (phenylalanine and valine); LP(+), low protein diet supplemented with tryptophan, histidine and arginine.

DRPR:
FIG. 8 is a graph illustrating the retroperitoneal fat pad weight of obese rats fed freely diet LP(-) or LP(+).

DRPR:
FIG. 11 is a graph illustrating the retroperitoneal fat pad weight of obese rats fed with restricted diets LP(-) or LP(+).

DEPR:
The inventors have discovered that administration to an animal of a diet, preferably a low calorie, low or no fat and low protein diet supplemented with the amino acid L-tryptophan, reduces the synthesis and secretion of hypothalamic NPY, and reduces appetite. Reducing appetite is likely to result in controlling weight. Administration to an animal of a diet, preferably a low calorie, low or no fat and low or no protein diet supplemented with the amino acid L-histidine, induces the synthesis and secretion of hypothalmic GRF, which modulates metabolism during dieting, such that a lower caloric threshold or set point is not established. This helps prevent weight gain when dieting is concluded, and thus controls weight. According to the present invention, controlling weight is enhanced by administering a diet including sufficient amounts of both tryptophan, to modulate (and preferably reduce) the synthesis and secretion of NPY to effectively reduce appetite, and histidine, to modulate (and preferably increase) the synthesis and secretion of GRF to effectively regulate metabolism.

DEPR:
In particular, the inventors have discovered that administration of tryptophan and histidine to an animal in a diet which is a low calorie diet having a defined amount of protein has the following effects: The appetite of the animal is reduced; the animal loses weight; the percent body fat of the animal is reduced; and, the level of NPY is reduced and the level of GRF is increased compared with NPY and GRF levels prior to the administration of tryptophan and histidine.

DEPR:
Thus, according to the present invention, supplementation of a low protein diet with tryptophan and histidine results in a reduction in the drive to eat in an animal and modulation of metabolism as described above. The effects of tryptophan and histidine on appetite control are most marked when the animal is fed a diet comprising a lower than normal protein content and which is supplemented by one or preferably both, of tryptophan or histidine.

DEPR:
The methods of the invention are most useful in controlling weight, in obese humans or animals, including pets and other animals such as dogs, cats, horses,

pigs, cows, and sheep. Obesity in humans or animals is generally characterized by weight and body mass particularly of fat tissue above currently accepted standards. Obesity in a human is defined as a condition where the individual has a Body Mass Index ("BMI"), sometimes called Quetelet's Index, above currently accepted standards. BMI is calculated by dividing weight (in kg) by height.sup.2 (in meters.sup.2). The current standards for both men and women accepted as "normal" are a BMI of 20-24.9 kg/m.sup.2. Grade I obesity corresponds to a BMI of 25-29.9 kg/m.sup.2 ; Grade II obesity corresponds to a BMI of 30-40 kg/m.sup.2 ; and Grade III obesity corresponds to a BMI greater than 40 kg/m.sup.2. (E. Jequier, "Energy, obesity, and body weight standards," Am. J Clin. Nutr., 45:1035-47 (1987)). Ideal body weight will vary among species and individuals based on height, body build, bone structure, and sex.

DEPR:
A normal daily diet in humans generally comprises the following: about 2,800 to significantly more calories, comprising about 12 g to about 45 g of protein, about 120 g to about 610 g of carbohydrate, and about 11 g to about 90 g of fat. A low calorie diet would be no more than about 85%, and preferably no more than about 70%, of the above.

DEPR:
In animals, the caloric requirements vary depending on the species and size of the animal. For example, in cats, the total caloric intake per pound, as well as the percent distribution of protein, carbohydrate and fat varies with the age of the cat and the reproductive state. A general guideline for cats, however, is 40 cal/lb/day (18.2 cal/kg/day). About 30% to about 40% should be protein, about 7% to about 10% should be from carbohydrate, and about 50% to about 62.5% should be derived from fat intake.

DEPR:
The diet comprises a low calorie, low protein diet which is supplemented with an amount of tryptophan sufficient to lower levels of NPY in the individual to normal non-obese levels and thereby control the individual's desire to eat. In humans, although the amounts may vary from individual to individual, suitable amounts of tryptophan that are capable of reducing the levels of NPY a minimum of 15% below baseline value, are estimated to be about 5 mg to about 125 mg per g protein. The preferred and more preferred amounts of tryptophan that are required to decrease the levels of NPY to a minimum of 15% below baseline values are 6 mg/g protein to about 61 mg/g protein and about 8 mg/g protein to about 31 mg/g protein, respectively.

DEPR:
The low calorie, low protein diet may be further supplemented with an amount of histidine sufficient to increase the levels of GRF in the individual and thereby restore depressed serum growth hormone levels such that the basal metabolic rate is equal to or greater than the predict basal metabolic rate. In adult humans, GH acts as a principal metabolic regulatory hormone, promoting lipolysis and inhibiting protein breakdown. Release of GH is controlled by hypothalamic GRF and increasing GRF levels correlates with a rise in plasma GH levels. In obese humans, low plasma GH levels are associated with a reduced metabolic rate, and with increased fat deposition and protein breakdown (C. Dieguez, M. D. Page and M. F. Scanlon, "Growth hormone neuroregulation and its alterations in disease states," Clinical Endocrinology, 28:109-143 (1988)). Thus, the desired target metabolic rate is where the body bums fat in preference to lean body tissue, and may be determined by comparing the amount of fatty tissue to lean body tissue, ascertained by measuring total body weight and fat content at the beginning and end of the dietary period. Based on animal data (Bruno et al. (1993), supra), suitable amounts of histidine that are capable of elevating the levels of GRF to a minimum of 15% above baseline values in obese humans are estimated to be about 10 mg/g protein to about 270 mg/g protein. The preferred and more preferred ranges of histidine are about 15 mg/g protein to about 135 mg/g protein and about 17 mg/g protein to 68 mg/g protein, respectively.

DEPR:
It is believed that low levels of GRF contribute to low levels of plasma GH which correlates with a lower catabolism of fat tissue to lean tissue, hereinafter "fat/lean tissue catabolism". Therefore, raising plasma GH levels desirably increases fat/lean tissue catabolism. Raising hypothalamic GRF levels correlates with raising plasma GH levels.

DEPR:
According to the invention, the individual desiring to lose weight preferably is administered a low calorie, low protein diet, supplemented with tryptophan and histidine in place of a normal diet. Typically, the low calorie, low protein supplemented diet of the invention is administered about three times (i.e., given in three meals) during the course of a day, but the frequency of administration or consumption is not as important as total daily administration or consumption. Thus, the total amount to be ingested per day may be administered in one serving or in many more than one serving per day, depending on the eating habits of the individual or animal. Likewise, specific calorie requirements may need to be adjusted on an individual basis, i.e., sex body build, activity, etc.

DEPR:
The present invention includes a human food composition wherein the composition comprises a daily diet of less than about 2,400 calories, about 10 g to about 540 g of protein and at least one of (a) about 5 mg to about 125 mg of tryptophan per g of protein and (b) about 10 mg to about 270 mg of histidine per g of protein.

DEPR:
A preferred human food composition of this invention comprises a daily diet of about 800 to about 1,200 calories, about 10 g to about 270 g of protein and at least one of (a) about 6 mg to about 61 mg of tryptophan per g of protein and (b) about 15 mg to about 135 mg of histidine per g of protein.

DEPR:
A more preferred human food composition according to this invention comprises a daily diet of less than about 800 calories, about 10 g to about 180 g of protein and at least one of (a) about 8 mg to about 31 mg of tryptophan per g of protein and (b) about 17 mg to about 68 mg of histidine per g of protein.

DEPR:
Another preferred human food composition of this invention comprises a daily diet of less than about 2,400 calories, about 10 g to about 540 g of protein, about 60 g to about 540 g of carbohydrate, about 2 g to about 240 g of fat, and at least one of (a) about 5 mg to about 125 mg of tryptophan per g of protein and (b) about 10 mg to about 270 mg of histidine per g of protein.

DEPR:
Still another preferred human food composition according to this invention comprises a daily diet of about 800 to about 1,200 calories, about 10 g to about 270 g of protein, about 30 g to about 270 g of carbohydrate, about 1 g to about 120 g of fat, and at least one of (a) about 6 mg to about 61 mg of tryptophan per g of protein and (b) about 15 mg to about 135 mg of histidine per g of protein.

DEPR:
A still more preferred human food composition of this invention comprises a daily diet of less than about 800 calories, about 10 g to about 180 g of protein, about 20 g to about 180 g of carbohydrate, about 0.5 g to about 80 g of fat, and at least one of (a) about 8 mg to about 31 mg of tryptophan per g of protein and (b) about 17 mg to about 68 mg of histidine per g of protein.

DEPR:
To assess the effects of the practice of the methods of the invention on obesity in a human, weight, body fat and appetite are measured in each individual on the diet. Human weight may be assessed using a standard, preferably calibrated scale at frequent, preferably uniform intervals ranging from once daily to every several days to weekly or even less or more frequently.

DEPR:
Percent body fat in a human may be measured by standard techniques, such as those described in Katch and McArdle: Nutrition, Weight Control, and Exercise, 3rd ed., Leah Ferbiger, Philadelphia (1988).

DEPR:
Several commonly used procedures to assess percent body fat are:

DEPR:
1) Hydrostatic weighing (also referred to as underwater weighing): This procedure

computes an individual's body volume as the difference between body weight measured in air and weight measured during water submersion, i.e., body volume is equal to the loss of weight in water (with the appropriate temperature correction for the water's density). The individuals body density is then calculated as body weight divided by body volume. The relative percent of fat in the human body can then be estimated with a simple equation that incorporates body density:

DEPR:
This equation was derived from the theoretical premise that the densities of fat and fat-free tissues remain relatively constant even with large variations in total body fat.

DEPR:
3) Measurement of subcutaneous fat by the fat fold technique: In this technique, a pincer-type caliper is used to measure subcutaneous fat by determining skin fold thickness at representative sites on the body. These skin fold measurements are then used to compute body fat by either adding the scores from the various measurements and using this value as an indication of the relative degree of fatness among individuals or by using the measurements in mathematical equations that have been developed to predict percent body fat.

DEPR:
4) Ultrasound: In this technique, an ultrasound meter is used to measure the distance between the skin and fat-muscle layer, and between the fat-muscle layer and bone. The high frequency sound waves emitted by the meter pass through adipose tissue until they reach the muscle layer where the waves are reflected from the fat muscle interface to produce an echo that travels back to the meter where it is converted to a distance score. The distance the waves travel indicates fat thickness. Measurements are performed at various sites of the body and used in mathematical formulas to calculate percent body fat.

DEPR:
5) Bioelectrical impedance test: In this technique, electrodes are attached to one hand and one foot of an individual and a radio frequency pulse is run through the body to measure its water content which is used as a guide to body fat.

DEPR:
Since NPY is a potent regulator of appetite, the expression of NPY should be altered in an experimental system of aberrant metabolism, i.e., food deprivation. Thus, our predictions were that food-deprived animals would have increased NPY expression (continuous stimulation of the drive to eat) compared to fed controls and that refeeding would restore NPY levels to that seen in normal satiated animals. Moreover, the food deprivation model was used to permit a detailed evaluation of potential metabolic signals, i.e., nutrients (fat, protein and carbohydrates) that act as modulators of NPY expression.

DEPR:
To determine the effect of refeeding diets deficient in select nutrients to food deprived (FD) rats on levels of hypothalamic preproNPY mRNA, rats were allowed free access to food (Fed), FD for 72 h, or 72 h FD then refed for 72 h with either a normal (normal fed=NF; normal refed=NRF) diet or isocaloric diets free of fat (fat free=FF; fat free refed=FFRF), protein (protein free=PF; protein free refed=PFRF) or carbohydrate (carbohydrate free=CF; carbohydrate free refed=CFRF). The results are shown in FIG. 3. Food deprivation resulted in a 2-fold increase in hypothalamic preproNPY mRNA. Upon refeeding, preproNPY mRNA levels were normalized by NRF, FFRF, and CFRF diets; however, the PF diet was without effect. Therefore further experiments were performed to evaluate dietary protein regulation of NPY gene expression.

DEPR:
The effect of refeeding diets varying in protein composition on hypothalamic content of preproNPY mRNA was determined in groups of rats allowed free access to food or 72 h FD then refed isocaloric diets containing 4%, 8%, or 12% protein for 72 h. The results are shown in FIG. 4 and discussed below.

DEPR:
Several possible mechanisms could account for the influence of the lack of dietary protein on hypothalamic NPY gene expression. One possibility is that protein deprivation might reduce or deplete amino acids necessary for

neurotransmitter/neuropeptide synthesis. This experiment tested this hypothesis by measuring hypothalamic preproNPY mRNA in FD rats refed PF diets supplemented with individual amino acids directly involved in neuronal signal transmission or that serve as neurotransmitter precursors. Animals were adapted for 3-5 days to the facility at which time they were fed the same normal AIN 76A Semipurified Diet as before ad libitum for 3 days before the start of all experiments. Then they were divided into groups evenly matched for body weight. Protein free diets supplemented with individual amino acids contained each amino acid at the concentration found in the normal diet, i.e., 1.26% tyrosine, 0.30% tryptophan, 4.72% glutamic acid, and 0.60% histidine. All groups had free access to drinking water and were weighed before and after food deprivation and again after refeeding. Food consumption was monitored daily by subtracting uneaten food from total food given.

DEPR:
The effect of refeeding select amino acids added to a protein-free diet on hypothalamic content of preproNPY mRNA was determined in groups of rats FD then refed for 72 h with either a normal (NF) diet, an isocaloric diet free of protein (PF), or PF diets supplemented with tyrosine (Tyr), tryptophan (Trp), glutamic acid (GA) or histidine (His) and compared to groups of rats allowed free access to food (Fed) or FD. The results are shown in FIG. 5 and discussed below.

DEPR:
Solution hybridization/nuclease protection assays were performed as described using 5 .mu.g total RNA from each hypothalamus (J. D. White et al., Measurement of neuroendocrine peptide mRNA in discrete brain regions," Methods in Enzymology, P. M. Conn (Ed.), Academic Press, Orlando, Fla., 124:548-560 (1986); J. F. Bruno et al., "Influence of food deprivation in the rat on hypothalamic expression of growth hormone-releasing factor and somatostatin," Endocrinology 127:2111-2116 (1990); J. F. Bruno et al., "Regulation of rat hypothalamic preprogrowth hormone-releasing factor messenger ribonucleic acid by dietary protein," Endocrinology 129:1226-1232 (1991)). After separation of stable hybrids on 8% polyacrylamide-8 M urea gels, the dried gels were exposed to Kodak (Rochester, N.Y.) X-Omat x-ray film to generate an autoradiograph; exposure times were from 24-72 h. Autoradiographic densities were quantitated using an LKB (Rockville, Md.) laser densitometer in the two dimensional scan mode to obtain a densitometric value for the entire autoradiographic band.

DEPR:
The effect of refeeding diets deficient in fat, protein, or carbohydrate to 72 h FD rats on hypothalamic preproNPY mRNA content is shown in FIG. 3. As shown, 72 h FD rats displayed the expected 2 fold increase in hypothalamic preproNPY mRNA. Refeeding 72 h FD rats NRF, FFRF, or CFRF diets completely restored preproNPY mRNA levels to fed controls. PreproNPY mRNA levels in rats refed a PFRF diet, however, were not significantly different from 72 h FD rats.

DEPR:
To further investigate the regulation of hypothalamic preproNPY mRNA by dietary protein, groups of 72 h FD rats were refed diets containing 4%, 8%, or 12% protein (PRF) for 72 h. As shown in FIG. 4, hypothalamic preproNPY mRNA levels were increased 2-fold in 72 h FD rats. Upon refeeding, preproNPY mRNA levels remained elevated in rats fed a PFRF diet, whereas feeding diets varying in protein content restored preproNPY mRNA levels to Fed values.

DEPR:
Results from these studies demonstrated that food-deprived rats show a dramatic increase in hypothalamic preproNPY mRNA levels occurring as a result of dietary protein restriction. Rats food-deprived for 72 h (FD) demonstrated an increase in hypothalamic preproNPY mRNA levels by over two-fold compared to fed controls. Refeeding FD rats restored preproNPY mRNA levels to control values by 48 h.

DEPR:
In addition, the data indicate that increased hypothalamic preproNPY mRNA expression in FD rats occurs as a result of dietary protein deprivation. Refeeding FD rats a normal (NRF) diet, or protein-containing fat free (FFRF) or carbohydrate free (CFRF) diets normalized hypothalamic preproNPY mRNA levels while those refed a protein free (PFRF) diet demonstrated preproNPY mRNA levels similar to those in FD rats. Isocaloric diets containing 4%, 8% or 12% protein fed to FD rats restored preproNPY mRNA to fed values.

DEPR:
Furthermore, the inventors have identified tryptophan as a major component of dietary protein involved in regulating NPY gene expression. The results of the studies of this example clearly show that when FD rats are refed PF diets supplemented with individual amino acids that serve as neurotransmitters or neurotransmitter precursors, only tryptophan could restore preproNPY mRNA levels toward control values. PF diets containing Tyr, His or GA failed to restore levels above that seen with a PF diet alone (i.e., levels not significantly different than FD rats).

DEPR:
Thus, the results of these studies coupled with the previous finding that hypothalamic GRF expression is regulated by the amino acid histidine, and the additional finding in the following Example 2, led to the formulation of the preferred diet identified herein, i.e., a low calorie, low protein diet containing tryptophan to maintain NPY at levels to control the drive to eat and histidine at levels to regulate GRF and restore plasma growth hormone, thus promoting lipolysis, i.e., breaking down fat instead of muscle protein.

DEPR:
Thirty male Sprague Dawley rats weighing 273.+-.10 g were placed on a high calorie, high fat diet (4.8 kcal/gm, 46% of calories derived from fat) in order to render them obese. This method of generating obesity was chosen over other available genetic models since it best mimics the most common natural form of obesity in humans.

DEPR:
To assess obesity, a control group of rats weighing 268.+-.13 g was maintained under identical housing conditions with the exception that the control group was fed a diet comprising standard laboratory rat chow (Ralston-Purina, St. Louis, Mo.). After 16 weeks, the average weight of the control group was 521 g with a standard deviation of 24 g. Obesity in rats is defined as that weight which exceeds the mean weight of a control group by at least two standard deviations. Thus, in this experiment a rat was considered to be obese when the total body weight of the animal was at least 50 g more than the mean weight of control rats. This control group was used to determine the weight of animals during the course of the experiment that were not fed the high fat diet. Thus, obese Sprague-Dawley rats should weigh at least 571 g. Using this definition, twenty of the original thirty Sprague Dawley rats which were maintained on the high calorie, high fat diet were obese with a mean weight 615.+-.38 g. These were selected as the test group of animals.

DEPR:
Standard laboratory rat chow comprises approximately 20% protein, 65% carbohydrate, 5% fat, 5% cellulose and 5% vitamin and mineral supplements. This diet was used as a basis for constructing two isocaloric experimental diets which were modified to contain 6.7% protein, 76.6% carbohydrate, 5% fat, 5% cellulose and 5% vitamin and mineral supplements. This same basic diet was fed to all animals, i.e., all animals had vitamins and minerals. This low protein diet served as a low protein level to which the specific amino acids tryptophan and histidine were added. Table 4 below reflects the formulation of the diet.

DEPR:
Two formulations of this low protein diet were made which were designated as Low Protein+[LP(+)] and Low Protein-[LP(-)]. LP(+) was supplemented with 0.5% L-tryptophan, 0.83% L-histidine and 0.6% L-arginine. LP(-) was supplemented with phenylalanine and valine at levels approximating the combined amount of tryptophan, histidine and arginine present in the LP(+) diet, i.e., 0.9% of each amino acid, without exceeding the normal physiological levels.

DEPR:
The metabolic rate of an animal is assessed by measuring the amount of lean tissue versus fatty tissue catabolized by the animal following the diet period. Thus, total body weight and fat content were measured at the end of the dietary period. In rats, a frequently used method to determine total body fat is to surgically remove and weigh the retroperitoneal fat pad, a body of fat located in the retroperitoneum, the area between the posterior abdominal wall and the posterior parietal peritoneum. The pad weight is considered to be directly

related to percent body fat of the animal. Since the relationship between body weight and body fat in rats is linear, obese animals have a correspondingly higher percent of body fat and retroperitoneal fat pad weight.

DEPR:
Retroperitoneal fat pad weight for obese rats fed ad libitum diets LP(-) and LP(+) is presented in FIG. 8. The fat pad of Group A weighed 1.2 g more than that of Group B (18.3.+-.0.5 g for Group A vs. 17.1.+-.0.5 g for Group B), however, this difference was not significant.

DEPR:
Retroperitoneal fat pad weight of rats in Groups C and D is presented in FIG. 11. As shown, fat pad weight tended to be higher in rats fed the LP(-) diet having a mean weight of 16.4 g compared to an average pad weight of 14.8 g for rats fed the LP(+) diet, a difference of 1.6 g.

DEPR:
Control of food intake, body weight and metabolism depends on a complex set of interrelated processes that, ultimately, are controlled through the actions of the central nervous system. However, control by the brain of these behaviors and physiological parameters is determined by the interaction of peripheral metabolic signals that are recognized by the brain and then acted upon appropriately. Thus, defining the neural systems through which food intake and metabolism are controlled as well as the signals to which these systems respond are of critical importance to understanding control of feeding and metabolism. Two neural systems implicated in controlling these processes have been identified. The first system is NPY which is one of the most potent naturally occurring substances that can stimulate feeding. The second system is GRF. This peptide regulates growth hormone secretion which in adults acts as a principal metabolic regulatory hormone promoting lipolysis while inhibiting protein breakdown. In experimental models of aberrant metabolic homeostasis associated with hyperphagia, i.e., in models analogous to human obesity, NPY and GRF are regulated in parallel but opposite direction. Thus, NPY levels are elevated stimulating the drive to eat and GRF levels are depressed which is associated with reduced plasma growth hormone levels and reduction in lipolysis and metabolic rate. The inventors have demonstrated that the levels of these two neurotransmitters can be regulated by specific amino acids. For NPY the critical amino acid is tryptophan, while the critical amino acid for GRF is histidine.

DEPR:
The experimental data presented herein support the conclusion of these experiments that feeding rats the LP(+) diet, i.e., a low calorie, low protein diet supplemented with the amino acids tryptophan and histidine, had a dramatic effect on appetite and metabolism when compared to animals fed an identical diet lacking these supplements.

DEPR:
Animals fed the LP(+) diet on an ad libitum basis tended to gain less weight, to eat less and to have less fat. However, the major and most dramatic findings were observed when animals were fed both test diets on a restricted regimen. Thus, animals fed the LP(+) diet at 18 g/rat/day lost more weight than rats fed the same amount (i.e., the same number of calories) of the LP(-) diet. The most likely explanation for this startling finding is that the LP(+) diet had a major effect on the metabolic rate of the animal, as predicted. Thus, a higher basal metabolic rate would require more calories and over time result in a greater loss of weight.

DEPR:
Another major aspect of this invention is that supplementation with histidine regulates GRF levels and normalizes plasma growth hormone levels, thus promoting lipolysis while inhibiting protein breakdown. Rats fed the LP(+) diet had less overall body fat as measured by retroperitoneal fat pad weight.

DEPR:
Perhaps the most conclusive evidence as to the efficacy of this invention is the nuclease protection data measuring hypothalamic preproNPY mRNA and preproGRF mRNA levels. The data support the conclusion that body weight, appetite and total body fat were being regulated by these neurotransmitters, which in turn were being regulated by the amino acids supplemented in the LP(+) diet, as determined by

reduced hypothalamic levels of preproNPY mRNA while preproGRF mRNA levels increased in animals fed the LP(+) diet.

DEPR:
Thus, when obese rats were fed a unique diet supplemented with amino acids that regulate the NPY and GRF neural systems, they experience greater weight loss, their appetite is better regulated and they have less overall body fat when compared to a second group of like obese animals fed the same number of calories of a similar diet lacking these key amino acids.

DEPR:
Development of a superior diet scheme that results in better, long term weight control while controlling appetite and minimizing the risk of muscle wasting is of obvious clinical significance. Such a diet will greatly benefit a large number of obese individuals with consequent, secondary benefits to their health, well-being, productivity and reduced societal burdens. This diet may prove to be particularly important in the treatment of obese patients suffering from Type II diabetes mellitus in whom renal complications will be exacerbated using typical high protein-hypocaloric diets. The diet formulation contained in this invention is such a diet.

DEPL:
Graded Protein Refeeding.

DEPL:
Graded Protein Refeeding.

DEPL:
Measurement of Body Weight, Food Consumption, Appetite and Body Fat in the Animals

DEPL:
Retroperitoneal Fat Pads

DEPL:
Measurement of Total Body Fat

DEEQ:
Percent fat=495/density-450.

DETL:
TABLE 1 Nutrient Composition of Test Diets (percent by weight) Protein Carbohydrate Fat Normal 18.3 67 5 Fat free 18.3 78.2 0 Protein free 0 83.1 5 Carbohydrate free 18.3 0 34 4% Protein 4 79.6 4.95 8% Protein 8 76.2 4.9 12% Protein 12 72.7 4.86

All diets were supplemented with 3.5% AIN mineral mix (Table 2) and 1% AI vitamin mix (Table 3). Alphacel, a nonnutritive additive available from ICN Biochemicals (Cleveland, Ohio), was included to make all diets comparable in caloric concentration (about 386 calories/100 g).

DETL:
TABLE 4 Formulation of Diets LP(+) and LP(-) Diet LP(+) Diet LP(-) % (g) % (kcal) % (g) % (kcal) Protein 8.7 8.8 8.1 8.3 Carbohydrate 77.6 79.6 78.2 80.2 Fat 5.0 11.5 5.0 11.5 Total 91.3 100.0 91,3 100.0 kcal/gm 3.90 3.90 Ingredients: gm kcal gm kcal Casein, 80 Mesh 66.7 266.8 66.7 266.8 DL-Methionine 1 0 1 0 Maltodextrin 10 150 600 150 600 Corn Starch 616 2464 617 2469 Sucrose 0 0 0 0 Cellulose, BW200 50 0 50 0 Corn Oil 50 450 50 450 Salt Mix S10001 35 0 35 0 Vitamin Mix V10001 10 40 10 40 Choline Bitartrate 2 0 2 0 L-Tryptophan 5 20 0 0 L-Histidine 8.3 33.2 0 0 L-Arginine 6 24 0 0 L-Phenylalanine 0 0 9 36 L-Valine 0 0 9 36 FD&C Red Dye #40 0 0 0.1 0 FD&C Blue Dye #1 0.1 0 0 0 FD&C Yellow Dye #5 0 0 0 0 Total 1000.1 3898 1000.1 3898

CLPR:
1. A method of reducing an animal's drive to eat comprising administering to the animal a diet comprising a lower amount of calories and protein than in a pre-administration diet prior to administering the lower calorie, lower protein

diet, and orally supplementing the diet with an appetite-reducing amount of tryptophan sufficient to reduce the animal's level of neuropeptide Y compared to a pre-administration level of neuropeptide Y.

CLPR:
2. A method of weight control in an animal comprising administering to the animal a diet comprising a lower amount of calories and protein than in a pre-administration diet prior to administering the lower calorie, lower protein diet, and orally supplementing the diet with an appetite-reducing amount of tryptophan sufficient to reduce the animal's level of neuropeptide Y compared to a pre-administration level of neuropeptide Y.

CLPR:
3. A method of stabilizing an animal's metabolic rate comprising administering to the animal a diet comprising a lower amount of calories and protein than in a pre-administration diet prior to administering the lower calorie, lower protein diet, and supplementing the diet with an amount of histidine sufficient to elicit an increase of a metabolic rate-stabilizing amount of growth hormone releasing factor in the animal to a level compared to a pre-administration level of growth hormone releasing factor.

CLPR:
4. A method of weight control in an animal comprising administering to the animal a diet comprising a lower amount of calories and protein than in a pre-administration diet prior to administering the lower calorie, lower protein diet, and supplementing the diet with an amount of histidine sufficient to elicit an increase of a metabolic rate-stabilizing amount of growth hormone releasing factor in the animal compared to a pre-administration level of growth hormone releasing factor.

CLPR:
5. A method of reducing an animal's drive to eat and increasing the animal's metabolic rate comprising administering to the animal a diet comprising a lower amount of calories and protein than in a pre-administration diet prior to administering the lower calorie, lower protein diet, and supplementing the diet with an appetite-reducing amount of tryptophan sufficient to reduce the animal's level of neuropeptide Y compared to a pre-administration level of neuropeptide Y and with an amount of histidine sufficient to elicit an increase of a metabolic rate-stabilizing amount of growth hormone releasing factor in the animal compared to a pre-administration level of growth hormone releasing factor.

CLPR:
6. A method of weight control in an animal comprising administering to the animal a diet comprising a lower amount of calories and protein than in a pre-administration diet prior to administering the lower calorie, lower protein diet, and supplementing the diet with an appetite-reducing amount of tryptophan sufficient to reduce the animal's level of neuropeptide Y compared to a pre-administration level of neuropeptide Y and with an amount of histidine sufficient to elicit an increase of a metabolic rate-stabilizing amount of growth hormone releasing factor in the animal compared to a pre-administration level of growth hormone releasing factor.

CLPR:
7. A method according to any one of claims 1 through 6 wherein the lower calorie, lower protein diet has no more than about 85% calories and protein than the pre-administration diet.

CLPR:
8. A method according to any one of claims 1 through 6 wherein the lower calorie, lower protein diet has no more than about 70% of the calories and protein than the pre-administration diet.

CLPR:
12. A human food composition for controlling weight wherein the composition comprises a daily diet of less than about 2,400 calories, about 10 g to about 540 g of protein and about 5 mg to about 125 mg of tryptophan per g of protein.

CLPR:
13. A human food composition according to claim 12 wherein the composition

comprises a daily diet of about 800 to about 1,200 calories, about 10 g to about 270 g of protein and about 6 mg to about 61 mg of tryptophan per g of protein.

CLPR:
14. A human food composition according to claim 12 wherein the composition comprises a daily diet of less than about 800 calories, about 10 g to about 180 g of protein and about 8 mg to about 31 mg of tryptophan per g of protein.

CLPR:
15. A human food composition according to claim 12 wherein the composition comprises a daily diet of less than about 2,400 calories, about 10 g to about 540 g of protein, about 60 g to about 540 g of carbohydrate, about 2 g to about 240 g of fat, and about 5 mg to about 125 mg of tryptophan per g of protein.

CLPR:
16. A human food composition according to claim 12 wherein the composition comprises a daily diet of about 800 to about 1,200 calories, about 10 g to about 270 g of protein, about 30 g to about 270 g of carbohydrate, about 1 g to about 120 g of fat, and about 6 mg to about 61 mg of tryptophan per g of protein.

CLPR:
17. A human food composition according to claim 12 wherein the composition comprises a daily diet of less than about 800 calories, about 10 g to about 180 g of protein, about 20 g to about 180 g of carbohydrate, about 0.5 g to about 80 g of fat, and about 8 mg to about 31 mg of tryptophan per g of protein.

CLPR:
18. A human food composition for controlling weight wherein the composition comprises a daily diet of less than about 2,400 calories, about 10 g to about 540 g of protein and about 10 mg to about 270 mg of histidine per g of protein.

CLPR:
19. A human food composition according to claim 18 wherein the composition comprises a daily diet of about 800 to about 1,200 calories, about 10 g to about 270 g of protein and about 15 mg to about 135 mg of histidine per g of protein.

CLPR:
20. A human food composition according to claim 18 wherein the composition comprises a daily diet of less than about 800 calories, about 10 g to about 180 g of protein and about 17 mg to about 68 mg of histidine per g of protein.

CLPR:
21. A human food composition according to claim 18 wherein the composition comprises a daily diet of less than about 2,400 calories, about 10 g to about 540 g of protein, about 60 g to about 540 g of carbohydrate, about 2 g to about 240 g of fat, and about 10 mg to about 270 mg of histidine per g of protein.

CLPR:
22. A human food composition according to claim 18 wherein the composition comprises a daily diet of about 800 to about 1,200 calories, about 10 g to about 270 g of protein, about 30 g to about 270 g of carbohydrate, about 1 g to about 120 g of fat, and about 15 mg to about 135 mg of histidine per g of protein.

CLPR:
23. A human food composition according to claim 18 wherein the composition comprises a daily diet of less than about 800 calories, about 10 g to about 180 g of protein, about 20 g to about 180 g of carbohydrate, about 0.5 g to about 80 g of fat, and about 17 mg to about 68 mg of histidine per g of protein.

CLPR:
24. A human food composition for controlling weight wherein the composition comprises a daily diet of less than about 2,400 calories, about 10 g to about 540 g of protein, about 5 mg to about 125 mg of tryptophan per g of protein and about 10 mg to about 270 mg of histidine per g of protein.

CLPR:
25. A human food composition according to claim 24 wherein the composition comprises a daily diet of about 800 to about 1,200 calories, about 10 g to about 270 g of protein, about 6 mg to about 61 mg per g of protein and about 15 mg of

tryptophan to about 135 mg of histidine per g of protein.

CLPR:
26. A human food composition according to claim 24 wherein the composition comprises a daily diet of less than about 800 calories, about 10 g to about 180 g of protein, about 8 mg to about 31 mg tryptophan per g of protein and about 17 mg to about 68 mg of histidine per g of protein.

CLPR:
27. A human food composition according to claim 24 wherein the composition comprises a daily diet of less than about 2,400 calories, about 10 g to about 540 g of protein, about 60 g to about 540 g of carbohydrate, about 2 g to about 240 g of fat, about 5 mg to about 125 mg per g of protein and about 10 mg of tryptophan to about 270 mg of histidine per g of protein.

CLPR:
28. A human food composition according to claim 24 wherein the composition comprises a daily diet of about 800 to about 1,200 calories, about 10 g to about 270 g of protein, about 30 g to about 270 g of carbohydrate, about 1 g to about 120 g of fat, about 6 mg to about 61 mg of tryptophan per g of protein and about 15 mg to about 135 mg of histidine per g of protein.

CLPR:
29. A human food composition according to claim 24 wherein the composition comprises a daily diet of less than about 800 calories, about 10 g to about 180 g of protein, about 20 g to about 180 g of carbohydrate, about 0.5 g to about 80 g of fat, about 8 mg to about 31 mg of tryptophan per g of protein and about 17 mg to about 68 mg of histidine per g of protein.

CLPR:
30. A method according to any one of claims 1 through 6, 9 and 10, wherein the animal is a human, and wherein the diet is supplemented with about 5 mg to about 125 mg of tryptophan per g of protein.

CLPR:
31. A method according to any one of claims 1 through 6, 9 and 10, wherein the animal is a human, and wherein the diet is supplemented with about 10 mg to about 270 mg of histidine per g of protein.

CLPR:
32. A method according to any one of claims 1 through 6, 9 and 10, wherein the animal is a human, and wherein the diet is supplemented with about 5 mg to about 125 mg of tryptophan per g of protein and about 10 mg to about 270 mg of histidine per g of protein.

CCXR:
426/656

CCXR:
426/658

CCXR:
426/72

ORPL:
Bruno et al., "Regulation of rat hypothalamic preprogrowth hormone-releasing factor messenger ribonucleic acid by dietary protein," Endorcinology, 129(3):1226-1232 (1991).

ORPL:
J.F. Bruno et al., "Regulation of rat hypothalamic preprogrowth hormone-releasing factor messenger ribonucleic acid by dietary protein," Endocrinology 129(3):1226-1232 (1991).

09/387809

FILE 'SCISEARCH' ENTERED AT 10:09:30 ON 08 JUN 2000

=> s (cat# or feline#) and (diabete# or obesity)

   6 FILES SEARCHED...
L1   1939 (CAT# OR FELINE#) AND (DIABETE# OR OBESITY)

=> s l1 and protein and fat and carbohydrate

   3 FILES SEARCHED...
   9 FILES SEARCHED...
L2   14 L1 AND PROTEIN AND FAT AND CARBOHYDRATE

=> dup rem l2

DUPLICATE IS NOT AVAILABLE IN 'FOREGE'.
ANSWERS FROM THESE FILES WILL BE CONSIDERED UNIQUE
PROCESSING COMPLETED FOR L2
L3   14 DUP REM L2 (0 DUPLICATES REMOVED)

=> d 1-14 bib ab

L3   ANSWER 1 OF 14 PROMT COPYRIGHT 2000 Gale Group

AN   1999:838312 PROMT
TI   OTC.
SO   Drug Topics, (6 Dec 1999) Vol. 143, No. 23, pp. 133.
     ISSN: 0012-6616.
PB   Medical Economics Company, Inc.
DT   Newsletter
LA   English
WC   350
     FULL TEXT IS AVAILABLE IN THE ALL FORMAT
AB   Jamieson Laboratories, Palmyra, Pa., (717) 838-5392, is presenting two new lines: Dr. Chicken Instant Chicken Soup Mix and a Cold & Flu Center. The Dr. Chicken package contains six servings of natural chicken soup. Each serving contains 1,000 mg of echinacea and 250 mg of astragalus. The Cold & Flu Center is a preloaded shelf module containing vitamin C, echinacea, elderberry, Red Dragon Cold & Flu, and zinc lozenges with vitamin C.

     Subscription: $58.00 per year. Published semimonthly. 5 Paragon Dr., Montvale, NJ 07645.

L3   ANSWER 2 OF 14 SCISEARCH COPYRIGHT 2000 ISI (R)
AN   1999:682772 SCISEARCH
GA   The Genuine Article (R) Number: 231XN
TI   **Cats** increase fatty acid oxidation when isocalorically fed meat-based diets with increasing **fat** content
AU   Lester T; CzarneckiMaulden G; Lewis D (Reprint)
CS   IOWA STATE UNIV, DEPT FOOD SCI & HUMAN NUTR, 1127 HUMAN NUTR SCI BLDG, AMES, IA 50011 (Reprint); IOWA STATE UNIV, DEPT FOOD SCI & HUMAN NUTR,

AMES, IA 50011; NESTEC LTD, FRISKIES RES & DEV, ST JOSEPH, MO 64503
CYA USA
SO AMERICAN JOURNAL OF PHYSIOLOGY-REGULATORY INTEGRATIVE AND COMPARATIVE PHYSIOLOGY, (SEP 1999) Vol. 46, No. 3, pp. R878-R886.
Publisher: AMER PHYSIOLOGICAL SOC, 9650 ROCKVILLE PIKE, BETHESDA, MD 20814.
ISSN: 0363-6119.
DT Article; Journal
FS LIFE
LA English
REC Reference Count: 47
ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS
AB This study tested the hypothesis that sedentary **cats** have the ability to adapt to high-**fat** carnivore diets by increasing **fat** oxidation. Twenty-four hour indirect calorimetry was used to determine total energy expenditure (TEE) and macronutrient oxidation in six vasectomized male (VAS) and six ovariectomized female (OVX) **cats** isocalorically fed lower-**fat** (53% **fat**, 45% **protein**) and higher-**fat** (71% **fat**, 26% **protein**) meat-based diets at maintenance for 8 days. **Fat** oxidation increased linearly with **fat** intake with a mean slope of 0.91 g **fat** oxidized/g **fat** intake ($P < 0.001$), with no change in TEE. However, VAS male **cats** were able to more precisely match **fat** oxidation with **fat** intake than OVX female **cats** ($P < 0.02$). Body **fat** content did not significantly influence **fat**; oxidation. These results demonstrate that **cats** maintain body weight during short-term isocaloric feeding of a high-**fat** carnivore-type diet in part by increasing **fat** oxidation commensurate with increases in **fat** intake. This ability may be an important mechanism underlying the resistance of **cats** to **obesity**, despite habitual consumption of high-**fat** diets.

L3 ANSWER 3 OF 14 JICST-EPlus COPYRIGHT 2000 JST
AN 990763084 JICST-EPlus
TI Regulation of ATP Citrate-Lyase Gene Expression in Hepatocytes and Adipocytes in Normal and Genetically Obese Rats.
AU FUKUDA H; IRITANI N
CS Tezukayama Gakuin Coll., Osaka
SO J Biochem, (1999) vol. 126, no. 2, pp. 437-444. Journal Code: F0286A (Fig. 5, Tbl. 2, Ref. 41)
CODEN: JOBIAO; ISSN: 0021-924X
CY Japan
DT Journal; Article
LA English
STA New
AB Transcriptional regulation of ATP citrate-lyase (ACL, one of the lipogenic enzymes) gene by glucose/insulin, polyunsaturated fatty acid(PUFA), and leptin has been investigated in hepatocytes and adipocytes of obese Wistar fatty rats and their lean littermates. The sequence spanning nucleotides -64 to -41 of the ACL gene, which is responsive to glucose/insulin stimulation Eur. J. Biochem. 247, 497-502, 1997!, was linked to a reporter gene and transfected into rat hepatocytes or adipocytes. The chloramphenicol acetyltransferase(**CAT**) activities in the presence of glucose alone were similar in primary cultured cells from both obese and lean rats. In the presence of glucose/insulin, however, the **CAT** activities were markedly increased in the hepatocytes of lean rats, but were not significantly increased in those of obese rats. The stimulation by glucose/insulin was reduced in PUFA-treated cells of lean rats. The stimulation was also reduced in leptin-treated cells or ob gene expression vector-containing cells. However, PUFA- or leptin-treated cells

from obese rats did not show a significant reduction in insulin stimulation. The same effects were observed at the endogenous mRNA and enzyme levels. Similar results were seen in adipocytes, although the stimulation and suppression levels were much smaller than in hepatocytes. The expression of endogenous insulin receptor in hepatocytes and adipocytes was reduced in the presence of leptin or PUFA. We previously found that insulin-binding capacities are also reduced in the presence of leptin or PUFA and are very low in obese rats in comparison with lean. Moreover, gel mobility shift assays using end-labeled ACL(-64/-41) revealed that nuclear factor(s) including Sp1 bind specifically to the sequence, and DNA-**protein** complex formation is reduced in the obese rats. (author abst.)

L3 ANSWER 4 OF 14 CABA COPYRIGHT 2000 CABI
AN 2000:44204 CABA
DN 20001408671
TI Food intake and blood glucose in normal and diabetic **cats** fed ad libitum
AU Martin, G. J. W.; Rand, J. S.
CS Companion Animal Science, School of Veterinary Science and Animal Production, University of Queensland, St Lucia 4072, Brisbane, Queensland, Australia.
SO Journal of Feline Medicine and Surgery, (1999) Vol. 1, No. 4, pp. 241-251.
37 ref.
DT Journal
LA English
AB Ten diabetic **cats** were studied at intervals for up to 12 months with twice-daily insulin injections. Ten clinically healthy **cats** were also studied. Diets fed were based on the individual **cat**'s performance, using mainly commercial dry or canned **cat** foods and fresh meat. In most cases more than one food was offered. Food was given fresh twice daily, and the **cats** allowed to eat ad libitum. Food intake and blood glucose were measured every 2 h in diabetic **cats** after insulin injection and in diabetic and normal **cats** without insulin injections. Food was quantified by the energy consumed (kJ ME), CP (g), crude **fat** (g) and **carbohydrate** (g). Blood glucose in 10 diabetic **cats** was measured for 2 h following a 20-min meal. Both diabetic **cats** and normal **cats** showed similar patterns of eating, with a higher food intake in the 2 h after fresh food was placed. Both groups of **cats** ate multiple small meals spread through the day and night. There was little or no correlation between the blood glucose and the amount of food consumed over the previous 2-h period, in insulin- or non-insulin-treated diabetic **cats**, or in normal **cats**. Overnight starvation did not significantly alter morning blood glucose in diabetic **cats**. No demonstrable appetite stimulation occurred following an occurrence of low blood glucose; however, recorded incidences were few. No post-prandial hyperglycaemia was seen in the 10 diabetic **cats** during a 2-h period following the ingestion of typical **cat** foods.

L3 ANSWER 5 OF 14 CABA COPYRIGHT 2000 CABI
AN 1999:80028 CABA
DN 991406597
TI Nutrition of **cats**
AU Petrosyan, T. L.
SO Krolikovodstvo i Zverovodstvo, (1998) No. 1, pp. 31-32.
ISSN: 0023-4885
DT Journal
LA Russian
AB Feed intake of **cats** depends on the growth stage, noise level, lighting condition, size, colour and form of food mixture, food

composition, presence or absence of people and animals including other **cats**, physiological state and illness, and subjection to cold weather. **Cats** should have free access to food at all times. It is essential that the food is complete in energy and has the right ratio among **proteins**, **fats**, **carbohydrates**, minerals and vitamins. For adult **cats** with average daily activity it is essential to provide ME at 75 kcal/kg body weight. Growing and lactating **cats** require 250 and at least 300 kcal/kg, respectively. The requirement for **protein** is considerably higher than that of other species; for adults it is 5 g/kg body weight. The **protein** should be of high biological value. Optimum amount of ME intake is at least 21% of total diet; for growing **cats** it is 28 to 29%. Growing kittens are more sensitive to the quality of dietary **protein** and amino acids than do adults. **Fats** make up to 60% energy; however with **fat** up to 40% diet DM **obesity** could result. **Cats** cannot convert carotene into vitamin A, and vitamin A or its sources should be provided. Requirement for the B-group vitamins is 5 times that for dogs. Excessive intake of calcium and phosphorus inversely affects metabolic processes. Magnesium at a level greater than 0.3% dietary DM can be poisonous during alkaline reactions in food, and could result in kidney stones. There are commercially prepared dry feeds for **cats**. These feeds contain 90 to 94% DM; with pasta about 70% and conserved foods 22%. **Cats** given dry feeds should be provided with fresh water.

L3 ANSWER 6 OF 14 PROMT COPYRIGHT 2000 Gale Group

AN 1998:367668 PROMT
TI Touch of Nature Natural Sweetener Now Being Sold in the United States and Canada.
SO Business Wire, (20 Jul 1998) pp. 07201203.
LA English
WC 597
FULL TEXT IS AVAILABLE IN THE ALL FORMAT
AB LAS VEGAS--(BUSINESS WIRE)--July 20, 1998--AZNT (AZNT:OTCBB) is pleased to announce the long awaited delivery of their 100% pure and natural sweetener, TOUCH OF NATURE(TM), to select retail stores in NV, AZ, AK, CA, NY, NB, IA, WI, MT, WY and Toronto, Canada.
"Touch of Nature(TM)" is a 100% pure natural product derived from the sap and leaves of a small tree found in the Brazilian Amazon Rainforest. This variety of tree has been named "Natures Taste" by one of the company's founders, Dr. Domingos Loricchio. The sap, necessary for the product, is extracted from the Natures Taste tree in much the same method as maple sap is obtained from maple trees in the United States and Canada. The leaves of the Natures Taste tree are then crushed to extract essential ingredients which are combined with the sap in a process which ultimately results in this wonderful all natural sweetener. "Touch of Nature(TM)" has characteristics which allow it to be used in the same application as sugar (saccharose or sucrose).
The Nutritional Facts analysis found that "Touch of Nature(TM)" per serving has 0 **fat**, 0 cholesterol, 0 sodium, 0 **carbohydrates** and 0 **protein**. It also leaves no after taste as do some synthetic sweeteners, is also non-fermentable which gives it extended shelf life, yet is equal or better in taste than cane sugar. "Touch of Nature(TM)" possesses natural properties that permit its use as an ideal sugar substitute for calorie restricted diets or for those suffering with **diabetes**. "Touch of Nature(TM)" is a delightfully surprising alternative for those individuals who prefer not to use regular

sugar or are reluctant to use artificial sweeteners. As a result, "Touch of Nature(TM)" may have applications in treatment programs for all forms of **diabetes**. These properties allow for its use as a sugar substitute in all drinks, hot or cold, as well as your favorite cooking recipes.

This product could be nature's answer to sweeteners and sugar substitutes being sold today, such as SWEET 'N LOW(R) and EQUAL(R). Products on today's market contain chemicals as Phenylalanine or Calcium Saccharin, which has been determined to cause cancer in laboratory animals.

L3 ANSWER 7 OF 14 PROMT COPYRIGHT 2000 Gale Group

AN 1998:210546 PROMT
TI The Truth About **Cats** & Dogs (and People)
SO PR Newswire, (30 Apr 1998) pp. 0430CLTH022.
LA English
WC 1175
FULL TEXT IS AVAILABLE IN THE ALL FORMAT
AB SAN FRANCISCO, April 30 /PRNewswire/ -- More than 400 companion animal nutrition experts from 44 countries are convening this weekend (April 30 -

May 2) at the 1998 Iams Nutrition Symposium -- the single largest gathering of veterinarians and academics in canine and **feline** nutrition in the world. The Symposium is being held at the Fairmont Hotel in San Francisco, CA.

Forty-six research papers will be presented, with topics including growth and development, **diabetes** management, **obesity**, neonatal health, immunology, gastrointestinal health, renal health, geriatric nutrition, physical stress and nutrition.

"Each of these studies opens new doors in designing nutritional interventions for improvement in the overall health of companion animals," said Dan Carey, DVM, director of technical communications at The Iams Company.

Revolutionary Learning for Humans

The Iams Company, in conjunction with leading universities, has discovered new information regarding canine and **feline** nutrition that may ultimately benefit human health. "Historically, veterinarians have looked to human research for help in discovering new cures or medical treatments," said Dr. Carey. "For the first time, physicians can now review veterinary research for possible answers to common human health issues such as **diabetes** or aging."

Diabetes - Common Among Humans And Pets

More than 16 million Americans suffer from **diabetes** and the number is increasing. The number of dog and **cats** with **diabetes** also is on the rise -- in fact, the number of **cats** or dogs with **diabetes** has quadrupled since the early 1970's.

There are obvious differences between animals and humans; however, it has been found that new information on diet and **diabetes** in **cats** and dogs may benefit humans.

"We have discovered that **cats** may develop type II **diabetes** -- the most common form of **diabetes** in humans -- when exposed to a **carbohydrate**-based diet," said Jacquie S. Rand, BVSc, DVSc from the University of Queensland in Queensland, Australia. **Cats** are carnivores, and research shows that **cats** may not be well suited to the long-term ingestion of large amounts of starch associated with diets that are low in **protein** and **fat**. It is possible that **cats** fed a high starch diet may eventually lose their ability to efficiently metabolize dietary **carbohydrates**.

L3 ANSWER 8 OF 14 AGRICOLA
AN 96:42091 AGRICOLA
DN IND20522147
TI Decreased ratio of **fat** to **carbohydrate** oxidation with increasing age in Pima Indians.
AU Rising, R.; Tataranni, P.A.; Snitker, S.; Ravussin, E.
CS Maimonides Medical Centers, Brooklyn, NY.
AV DNAL (RC620.A1J6)
SO Journal of the American College of Nutrition, June 1996. Vol. 15, No. 3. p. 309-312
Publisher: New York, NY : American College of Nutrition.
CODEN: JONUDL; ISSN: 0731-5724
NTE Includes references
CY New York (State); United States
DT Article
FS U.S. Imprints not USDA, Experiment or Extension
LA English
AB Background: Some metabolic changes related to age may increase the prevalence of **obesity**. Previous studies have shown that a low relative metabolic rate and a low ratio of **fat** to **carbohydrate** utilization are predictors of body weight gain. However, a possible relationship between age and energy substrate utilization (respiratory quotient; RQ = VCO2/VO2) has not been reported. Objective: To determine whether RQ increases and therefore **fat** oxidation decreases with age in Pima Indian men, independent of body **fat** and energy balance. Method: We analyzed longitudinal data collected in seven non-diabetic Pima Indian men (31 +/- 6 years, 167 +/- 8 cm, 111.0 +/- 23.7 kg and 41 +/- 9% **fat** at baseline) who had repeated measurements of 24-hour RQ 7 years apart. On both admissions, subjects were fed a weight maintenance diet (50% **carbohydrate**, 30% **fat** and 20% **protein**) for 3 days before spending 1 day within a respiratory chamber for measurements of 24-hour energy expenditure, basal metabolic rate, sleeping metabolic rate and 24-hour RQ. Paired t-test was used to determine differences between the first and last measurement of 24-hour RQ. Cross-sectional data in 131 Pima Indian men (28 +/- 9 years, 171 +/- 6 cm, 94.5 +/- 24.4 kg, and 32 +/- 9% **fat**) were also analyzed to determine the relationship between 24-hour RQ and age. Multiple regression analysis was used to adjust 24-hour RQ for differences in energy balance (intake/expenditure in %) and percent body **fat** and metabolic rate for differences in body size and composition. Results: Over a 7-year period, mean adjusted and adjusted 24-hour RQ increased ($p < 0.01$). Cross-sectional **cats** analysis showed that both the unadjusted ($r = 0.19$, $p < 0.03$) and adjusted ($r = 0.19$, $p < 0.03$) 24-hour RQ correlated with increasing age while adjusted BMR ($r = -0.21$, $p < 0.02$) correlated inversely with age. Conclusion: Despite a higher body **fat** content, older individuals utilize less **fat** than their younger counterparts. Reduced **fat** utilization and decreased BMR with age may both contribute to increasing **obesity** in older individuals.

L3 ANSWER 9 OF 14 AGRICOLA
AN 96:37915 AGRICOLA
DN CAT10700744
TI Canine and **feline** nutrition : a resource for companion animal professionals.
AU Case, Linda P.; Carey, Daniel P.; Hirakawa, Daine A.
AV DNAL (SF427.4.C37 1995)
LCN 95119829
SO c1995 xvii, 455 p. : ill. ; 24 cm
Publisher: St. Louis : Mosby, c1995.
ISBN: 0815115369.

NTE Includes bibliographical references and index.
Basics of nutrition -- Energy -- **Carbohydrates** -- **Fats** -- **Protein** and amino acids -- Vitamins -- Minerals -- Digestion and absorption -- Nutrient requirements of dogs and **cats** -- Nutritional idiosyncracies of the **cat** -- Energy balance -- **Carbohydrate** metabolism -- **Fat** -- **Protein** and amino acids -- Vitamins and minerals -- Pet foods -- History and regulation of pet foods -- Pet food labels -- Nutrient content of pet foods -- Types of pet foods -- Evaluation of commercial pet foods -- Feeding management throughout the life cycle.
Feeding regimes for dogs and **cats** -- Pregnancy and lactation -- Nutritional care of neonatal puppies and kittens -- Growth -- Adult maintenance -- Performance and stress -- Geriatrics -- Feeding practices; problems, fads and fallacies -- Development and treatment of **obesity** -- Overnutrition and supplementation -- Vitamin deficiencies and excess -- Common nutrition myths -- Nutritionally responsive disorders -- Inherited disorders of nutrient metabolism -- **Diabetes** melitus -- **Feline** lower urinary tract disease -- Nutrionally responsive dermatoses.
Chronic kidney disease -- **Feline** hepatic lipidosis -- Estimated metabolizable energy requirements of dogs -- Standard weights for AKC dog breeds -- AAFCO nutrient profiles: dog foods -- AAFCO nutrient profiles: **cat** foods -- NRC required concentrations of available nutrients in dog food formulated for growth -- NRC minimum requirements for growing kittens -- General guidelines for feeding ill animals.
CY Missouri; United States
DT Bibliography; (MONOGRAPH)
FS U.S. Imprints not USDA, Experiment or Extension
LA English

L3 ANSWER 10 OF 14 BIOSIS COPYRIGHT 2000 BIOSIS
AN 1996:30474 BIOSIS
DN PREV199698602609
TI Application of insulin in the management of **feline** **diabetes** mellitus.
AU Huang, Hui-Pi (1); Yang, Heng-Leng; Tsai, Huai-Ti; Chen, Kuang-Yang
CS (1) Dep. Veterinary Med., Coll. Agric., Natl. Taiwan Univ., Taipei 106 Taiwan
SO Journal of the Chinese Society of Veterinary Science, (1995) Vol. 21, No. 4, pp. 196-200.
ISSN: 0253-9179.
DT Article
LA English
SL English; Chinese
AB **Diabetes** mellitus is one of the common endocrine disorders in **cats**. This condition is a group of disorders in **carbohydrate**, **protein** and **fat** metabolisms which are due to an absolute or relative lack of insulin, and characterised by hyperglycaemia. Insulin replacement therapy is vital in the management of **diabetes** mellitus for **cat**'s survival. A seven-year-old, neutered male, domestic short-hair with type I **diabetes** mellitus was well controlled by protamine zinc insulin. The **cat** had quick metabolism of insulin which made the management of **diabetes** mellitus with this long-acting insulin administration once daily possible. Consequently, choosing an appropriate type of insulin depends on individual insulin metabolism.

L3 ANSWER 11 OF 14 CABA COPYRIGHT 2000 CABI
AN 95:60786 CABA
DN 952203450
TI Effects of **protein**, lipid, or **carbohydrate** supplementation on hepatic lipid accumulation during rapid weight loss in obese **cats**
AU Biourge, V. C.; Massat, B.; Groff, J. M.; Morris, J. G.; Rogers, Q. R.

CS Department of Molecular Biosciences, School of Veterinary Medicine, University of California, Davis, CA 95616, USA.
SO American Journal of Veterinary Research, (1994) Vol. 55, No. 10, pp. 1406-1415. 39 ref.
ISSN: 0002-9645
DT Journal
LA English
AB Effects of restricted tube-feeding (25% of energy requirements) of **protein**, lipid, or **carbohydrates** on body weight loss; haematological and clinical chemical variables; plasma lipid and amino acid concentrations; nitrogen balance; and hepatic histological features and lipid concentrations were compared with values in voluntary-fasting **cats** (control, CON). Twelve obese **cats** (6.1 plus or minus 0.1 kg, >40% above optimal body weight) were randomly assigned to 4 matched treatment groups (n = 3) - **protein** (PRO), lipid (LIP), **carbohydrate** (CHO), and CON- and were offered a low-palatability diet for 4 weeks. **Cats** of the PRO, LIP, and CHO groups were also tube-fed isocaloric amounts (88 kcal of metabolizable energy) of a casein-soybean **protein** mixture, corn oil, or a dextrin-dextrose mixture, respectively, during the 4 weeks. All **cats** fasted, rather than eat the low-palatability purified diet. **Cats** of the PRO group lost weight at a lower rate than did **cats** of other groups. After 4 weeks of fasting, serum alkaline phosphatase activities were higher than reference values in all **cats** of the CON and LIP groups and in 2 **cats** of the CHO group. At that time, 1 **cat** of the LIP group had lethargy, hepatomegaly, and hyperbilirubinaemia. Total hepatic lipid and triglyceride concentrations increased in all groups during the study, but the increase was significantly less in **cats** of the PRO group, compared with those of the CON and LIP groups, and those of the CHO group, compared with those of the LIP group. Hepatic total lipid and triglyceride concentrations correlated well with lipid score for liver biopsy specimens when lipidosis was mild or severe, but not as well in association with the intermediate lipidosis. **Cats** of the PRO group were in nitrogen balance after 2 weeks of fasting. All other **cats** remained in negative nitrogen balance during the fast, although less nitrogen was lost by **cats** of the CHO and LIP groups than by **cats** of the CON group. Plasma aminograms indicated that methionine and arginine might become limiting for **protein** synthesis during fasting in **cats**. Results indicated that dietary **protein** reduces hepatic lipid accumulation and nitrogen balance is maintained during rapid weight loss in obese **cats**. Ingestion of only lipids increases the risk of inducing hepatic lipidosis. Ingestion of **carbohydrates** reduces hepatic lipid accumulation, but is not as effective as **protein** in preventing all the clinical manifestations of hepatic lipidosis.

L3 ANSWER 12 OF 14 SCISEARCH COPYRIGHT 2000 ISI (R)
AN 91:242466 SCISEARCH
GA The Genuine Article (R) Number: FH319
TI **FELINE** DIETETICS - FOOD INTOLERANCE, **DIABETES** -MELLITUS, AND DEBILITATION
AU MOSER E A (Reprint)
SO COMPENDIUM ON CONTINUING EDUCATION FOR THE PRACTICING VETERINARIAN, (1991) Vol. 13, No. 4, pp. 607-611.
DT Article; Journal
FS AGRI
LA ENGLISH
REC No References Keyed
ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS
AB **Feline** dietetics is the study of diets intended to provide optimum health in **cats** and of the alteration of diets by restricting, moderating, or enhancing nutrients and/or manipulating

dietary ingredients to therapeutic advantage. Food intolerance pruritic skin disease is diagnosed by feeding an elimination diet (often referred to as hypoallergenic) with distilled water for three weeks until there is a decline in pruritus followed by exacerbation of signs caused by challenge exposure to the previous diet. Diabetic **cats** should be fed canned or dry fixed-formula foods with enhanced levels of crude fiber and complex **carbohydrates**, moderate levels of **protein**, and low to moderate levels of **fat**. In debilitating conditions, early and aggressive nutritional support consists of approximately 35% to 45% of metabolizable energy as **protein**, 30% to 50% of metabolizable energy as **fat**, and minimal contribution from **carbohydrates**.

L3 ANSWER 13 OF 14 CAPLUS COPYRIGHT 2000 ACS
AN 1990:49428 CAPLUS
DN 112:49428
TI Preadipocyte stimulating factor in rat serum: evidence for a discrete 63 kDa **protein** that promotes cell differentiation of rat preadipocytes in primary cultures
AU Li, Zhen Hua; Lu, Zhongding; Kirkland, James L.; Gregerman, Robert I.
CS Gerontol. Res. Cent., Natl. Inst. Aging, Baltimore, MD, 21224, USA
SO J. Cell. Physiol. (1989), 141(3), 543-57
CODEN: JCLLAX; ISSN: 0021-9541
DT Journal
LA English
AB In primary cultures of rat preadipocytes (PA) isolated from epididymal or perirenal depots, rat serum is more effective than other animal serums (fetal calf, newborn calf, human, horse, rabbit, **cat**, sheep, goat, dog, and pig) in promoting adipogenic conversion, biochem. differentiation, and mitogenesis. Only mouse serum is comparable to rat serum. This activity is attributable to a specific growth factor (preadipocyte stimulating factor, PSF). An assay for PSF in rat serum was devised using PA from perirenal **fat** of 3-mo-old Fischer 344 rats grown first to confluence in FCS for 8 days and then for the next 3 days in test serum, followed by measurement of triglyceride (TG) and glycerol 3-phosphate dehydrogenase (GPDH). Rat serum induces dose-dependent rapid cell division, which coincides with accumulation of TG and increase of GPDH; for routine quantitation, TG is assayed. The biochem. characteristics of PSF in serum are as follows: stable at 4.degree. for <1 yr; inactivated at 100.degree. (80% loss, 30 min) but stable at 56.degree. for 1 h; stable at pH 2-12; non-dialyzable; completely resistant to pepsin, trypsin, and chymotrypsin but destroyed by pronase and subtilisin; stable to DTT and periodate; and mol. wt. between 68 kilodaltons (Sephacryl-300) and 58 kilodaltons (Sephacryl-300 in 5M urea). PSF activity is greater in serum from Wistar than from Fischer 344 rats, whereas activity of serum from Zucker obese (fa/fa) rats is at least as great as that from Wistar rats and, like serum of rats made obese by feeding a high-**fat**, high-**carbohydrate** diet, is not suppressed. PSF activity is not due to insulin, insulin-like growth factor-1 (IGF-1), growth hormone, glucocorticoids, or combination of these hormones. PSF activity was not seen with a no. of growth factors including colony-stimulating factor (CSF-1), GM-CSF, interleukins 1, 2, and 3, neuroleukin, tumor necrosis factor, and others. PSF is distinct from the low-mol.-wt. (4-8 kilodalton) differentiation factor present in rat serum, FC5, and human serum that promotes the adipogenic conversion and cellular differentiation of 3T3-L1, 3T3-F442A, and Ob17 cells. PSF appears to be a new differentiation factor for rat preadipocytes, has properties suggestive of a highly glycosylated **protein**, and may be highly species specific.

L3 ANSWER 14 OF 14 CABA COPYRIGHT 2000 CABI
AN 87:96703 CABA
DN 872202102
TI Basics of **feline** nutrition
AU Burger, I.; Edney, A.; Horrocks, D.
SO In Practice, (1987) Vol. 9, No. 4, pp. 143...150. 9 ref.
ISSN: 0263-841X
DT Journal
LA English
AB The **cat**'s dependence on animal tissue relates to five characteristics: rapidly developing hyperammonaemia resulting from arginine deficiency; retinal degeneration and defective bile salt formation caused by taurine deficiency; the essentiality of arachidonic acid, niacin and vitamin A per se. Dietary excesses and deficiencies considered are **obesity**, hypervitaminoses A and D, pansteatitis, calcium excess, magnesium and zinc deficiency, and an all-meat diet. Ill **cats** require a routine of food offered warm, full-flavoured, and in small but frequent amounts. For **diabetes** mellitus, energy is best controlled with palatable canned foods; prepared foods containing **carbohydrates** are suitable, as up to 40% of calories can be digested from these provided they are in the form of complex polysaccharides. Treatment of nutritional diarrhoea includes withholding of solids for 24 hours, administration of electrolyte solutions and intestinal absorbents and provision of live yoghurt. Food allergies are mainly induced by milk casein and beef or fish **protein**. Measures against the **feline** urological syndrome comprise addition of up to 70 ml water to a wet diet, lowering of urinary pH by addition of methionine or ammonium chloride, and restriction of dietary magnesium. For chronic renal failure, wet foods with 30% **protein** (dry matter) are generally acceptable; additional calories are best provided from animal **fat**. A Ca:P ratio of 2:1 may impede the development of secondary hyperparathyroidism. Brewer's yeast should compensate for vitamin B depletion. Heavy proteinuria and weight loss may be offset by good quality **protein**.

=> s obligate carnivore

1 FILES SEARCHED...
L4 43 OBLIGATE CARNIVORE

=> s l4 and (diabetes or obesity)

10 FILES SEARCHED...
L5 0 L4 AND (DIABETES OR OBESITY)

=> dup rem l4

DUPLICATE IS NOT AVAILABLE IN 'FOREGE'.
ANSWERS FROM THESE FILES WILL BE CONSIDERED UNIQUE
PROCESSING COMPLETED FOR L4
L6 22 DUP REM L4 (21 DUPLICATES REMOVED)

=> d 1-22 bib ab

L6 ANSWER 1 OF 22 PROMT COPYRIGHT 2000 Gale Group

AN 2000:34928 PROMT
TI What Do Big Cats Eat? Eukanuba(R) Cat Food - If They're Lucky!
SO PR Newswire, (14 Jan 2000) pp. 1705.
PB PR Newswire Association, Inc.
DT Newsletter

LA English
WC 763
FULL TEXT IS AVAILABLE IN THE ALL FORMAT
AB - The Iams Company's partnership with the American Zoo and Aquarium
THIS IS THE FULL TEXT: COPYRIGHT 2000 PR Newswire Association, Inc.

L6 ANSWER 2 OF 22 CAPLUS COPYRIGHT 2000 ACS
AN 2000:157779 CAPLUS
TI Method and composition to protect an **obligate carnivore** from a disease ofabnormal carbohydrate metabolism
IN Hodgkins, Elizabeth A.
PA Heska Corporation, USA
SO PCT Int. Appl.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2000011964	A1	20000309	WO 1999-US20171	19990901

PI
W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

PRAI US 1998-98911 19980902
AB The present invention includes a method to protect an **obligate carnivore** from a disease of abnormal carbohydrate metabolism. The method includes the step of feeding the carnivore a nutritionally balanced diet that includes a low carbohydrate content, a high protein content, and a moderate fat content. The present invention also includes such a nutritionally balanced diet and a method to produce such a diet.
RE.CNT 7
(1) Allan, L; US 5792501 A 1998 CAPLUS
(2) Burkholder, W; JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION 1998, V212(5), P658 MEDLINE
(3) Franca, L; EP 0421956 A 1991
(4) Iams Company; WO 9844932 A 1998
(6) Kettelhut, I; AMERICAN JOURNAL OF PHYSIOLOGY 1980, V239(5), PR437 CAPLUS
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 3 OF 22 BIOSIS COPYRIGHT 2000 BIOSIS DUPLICATE 1
AN 1999:220448 BIOSIS
DN PREV199900220448
TI A review of the studies of the safety of polydextrose in food.
AU Burdock, G. A. (1); Flamm, W. G.
CS (1) Burdock and Associates, 622 Beachland Blvd, Suite B, Vero Beach, FL, 32963 USA
SO Food and Chemical Toxicology, (Feb.-March, 1999) Vol. 37, No. 2-3, pp. 233-264.
ISSN: 0278-6915.
DT Article
LA English
SL English
AB Polydextrose (CAS no. 68424-04-4) is a water-soluble polymer of glucose that provides to foods the bulk and texture of sucrose. There are two main forms of polydextrose, an acidic form (PD-A) and a neutralized potassium

salt (PD-N). Polydextrose is resistant to mammalian metabolic and microbial degeneration, rendering it both low in caloric value and non-cariogenic. Little polydextrose is absorbed intact although some is metabolized by caecal/colonic bacteria. At high enough levels of ingestion, this bacterial metabolism results in flatus, bloating, loose stools and ultimately a frank diarrhoea. Microbial metabolism also produces some volatile fatty acids that are absorbed by the animal and have calorigenic value. The species and dose threshold for persistent loose stools/watery diarrhoea determines the degree of electrolyte loss by the animal. In the dog, an **obligate carnivore**, sodium-sparing activity by the kidney and concomitant and obligatory calcium reuptake result in a well-defined aetiology of hypercalcaemia and subsequent nephrocalcinosis, particularly for PD-N. Of the species tested, the dog was the most sensitive to this carbohydrate with a no-effect level of 2000 mg/kg body weight/day. Omnivores, including the rat, mouse and monkey, have a no-effect level ranging from 2500 to 10,000 mg/kg body weight/day. No toxicity has been demonstrated in man, although the dose for laxation (to be distinguished from diarrhoea) is approximately 90 g/day (v. sorbitol at 70 g/day). Polydextrose did not show any reproductive toxicity, teratology, carcinogenesis, mutagenicity or genotoxicity. Polydextrose has been approved for food additive use (21 CFR 172.841) in the US, and an "ADI not specified" by the Joint WHO/FAO Expert Committee on Food Additives (JECFA, 1987). It has been approved in over 50 countries around the world and has been used extensively in the diet for over 15 years. Specification monographs are published in the Food Chemicals Codex (FCC) (NAS, 1996) and the FAO Compendium (JECFA, 1995). This review provides an overview of the studies and salient data, not previously reported in the scientific literature, which had been submitted to regulatory agencies in support of these approvals.

L6 ANSWER 4 OF 22 BIOSIS COPYRIGHT 2000 BIOSIS DUPLICATE 2
AN 1999:196249 BIOSIS
DN PREV199900196249
TI Management of indigenous North American deer at the end of the 20th century in relation to large predators and primary production.
AU Crete, M. (1); Daigle, C. (1)
CS (1) Service de la faune terrestre, Ministere de l'Environnement et de la Faune, 675, boul. Rene-Levesque Est, Quebec, Qc, G1R 5V7 Canada
SO Acta Veterinaria Hungarica, (1999) Vol. 47, No. 1, pp. 1-16. ISSN: 0236-6290.
DT Article
LA English
AB Five deer species occupy North America: caribou (3.6 X 106 individuals), moose (1.1 X 106), white-tailed deer (28.5 X 106), mule deer (5.0 X 106) and wapiti (1.1 X 106). Caribou characterise the north of the boreal forest and the tundra, whereas moose dominate in coniferous and mixed forests growing further south. White-tailed deer are typical of the decidous forests of the east while mule deer replace them in the mountainous terrain of the west. Wapiti possess the smallest range, mostly adjacent to the prairies to the west. The two large **obligate carnivores** preying on deer show a reduced distribution: wolves are almost restricted to Canada, and cougar to the mule deer range. We determined the current status of each species with the help of a questionnaire mailed to all jurisdictions harbouring deer. Most reports of threatened populations concerned caribou whereas many jurisdictions declared overabundance of white-tailed deer and wapiti. Hunting was

allowed for all species when they abounded in a jurisdiction. Hunters harvested annually 7.0 X 106 deer on the continent, 87% being white-tailed deer. The two species that caused most conflicts with humans had the highest harvest rate: 16-17%. In terms of biomass, white-tailed deer and wapiti yielded the highest harvests, with 55 and 39 kg X km-2 of range, respectively. The average standing biomass of deer in winter ranged between 28 kg X km-2 in Nevada to 901 kg X km-2 in Indiana. The lowest standing biomasses occurred in the boreal forest (predators), in the prairies (agriculture) and in the south-west (aridity), and the highest ones in the south-east, where only white-tailed deer is present. The current abundance of deer in North America parallels, in general, the primary production of the landscape (r2 = 0.38; P < 0.0001), but predators and human activity modify this pattern.

L6 ANSWER 5 OF 22 BIOSIS COPYRIGHT 2000 BIOSIS DUPLICATE 3
AN 1996:406551 BIOSIS
DN PREV199699128907
TI Frequency-dependent food selection by domestic cats: A comparative study.
AU Church, Stuart C. (1); Allen, John A.; Bradshaw, John W. S.
CS (1) Dep. Biol., Univ. Southampton, Bassett Crescent East, Southampton SO16 7PX UK
SO Ethology, (1996) Vol. 102, No. 6, pp. 495-509.
ISSN: 0179-1613.
DT Article
LA English
AB Preferences for common food types ('apostatic selection') have been demonstrated in a wide variety of vertebrate predators, yet there are few examples of preferences for rare food types ('antiapostatic selection'). Anti-apostatic selection is predicted to occur when, among other things, there are nutritional benefits to be gained from the consumption of a mixed diet. We tested this hypothesis by examining the frequency-dependent food preferences of domestic cats (Felis silvestris catus) with different nutritional histories. Subjects were classified as being either nutritionally 'experienced' (farm and rescue shelter cats, with a history of scavenging for nutritionally variable foods) or nutritionally 'inexperienced' (cats reared indoors on high-quality, nutritionally complete diets). We tested for frequency dependence by allowing individuals and groups of cats from the two groups to select from high-density mixtures of two types of artificial food pellet. In experiments on individual cats, nutritionally experienced subjects showed significant anti-apostatic selection, whereas inexperienced cats produced only a weak anti-apostatic trend. In experiments on groups of cats, both inexperienced and experienced groups showed significant anti-apostatic selection. The apparent inconsistency between individual and group results could be explained in terms of the additional anti-apostatic effects that result from variation among individuals in group foraging situations (i.e. when the effects of individuals are pooled). Because other behavioural explanations, such as perceptual contrast and sampling effects, were unlikely to have influenced our results, we conclude that the differences in selection between experienced and inexperienced individuals were probably due to the differing extent to which the consumption of a mixed diet was beneficial. These experiments may offer some insight into the success of the domestic cat in urban areas: although **obligate carnivores**, they appear to possess flexible feeding strategies which will tend to allow them to select a reasonably balanced diet from nutritionally variable resources in, for example, refuse bins.

L6 ANSWER 6 OF 22 BIOSIS COPYRIGHT 2000 BIOSIS DUPLICATE 4

AN 1996:330141 BIOSIS
DN PREV199699052497
TI Diet of two freshwater turtles, Chelodina rugosa and Elseya dentata (Testudines: Chelidae) from wet-dry tropics of northern Australia.
AU Kennett, Rod (1); Tory, Oswald
CS (1) North Australia Res. Unit, Aust. Natl. Univ., PO Box 41321, Casuarina, NT 0811 Australia
SO Copeia, (1996) Vol. 1996, No. 2, pp. 409-419.
ISSN: 0045-8511.
DT Article
LA English
AB Chelodina rugosa occupies seasonally ephemeral waterholes on the coastal freshwater floodplains of the wet-dry tropics of northern Australia. It is an **obligate carnivore** and feeds primarily on fish, fast-moving aquatic invertebrates, and carrion. Differences between wet-season and dry-season diets, notably an increase in fish consumption and a decrease in consumption of odonate nymphs, reflect changes in abundance or accessibility of prey items. Elseya dentata occupies permanent water riverine habitats and is primarily herbivorous. The bulk of its diet consists of fruit and leaves of riparian rainforest trees, and seasonal changes in fruit species consumed reflected fruiting patterns. Filamentous algae comprised 30% by mass of the dry-season diet but was absent from the river during wet-season flooding and hence was absent from the diet. Elseya dentata readily feed on meat and fish carrion when available, but animal prey such as shrimp (Macrobrachium sp.) and freshwater sponge formed only a small proportion of their diet. Because E. dentata relies on riparian trees for most of its dietary intake, it is extremely vulnerable to land management practices that have adverse impacts on riparian forests.

L6 ANSWER 7 OF 22 AGRICOLA DUPLICATE 5
AN 96:56318 AGRICOLA
DN IND20531604
TI Food selection by the domestic cat, an **obligate carnivore**.
AU Bradshaw, J.W.S.; Goodwin, D.; Legrand-Defretin, V.; Nott, H.M.R.
CS University of Southampton, Southampton, U.K.
AV DNAL (QP1.C6)
SO Comparative biochemistry and physiology. Part A, Physiology, July 1996. Vol. 114A No. 3. p. 205-209
Publisher: Tarrytown, NY : Elsevier Science Inc.
NTE Includes references
CY New York (State); United States
DT Article
FS U.S. Imprints not USDA, Experiment or Extension
LA English
AB The domestic cat Felis silvestris catus is the most accessible member of the family Felidae for the study of the relationship between food selection and nutrition. In contrast to pack-living animals such as the dog, and opportunistic omnivores such as the rat, the cat is generally able to maintain its normal body weight even when allowed ad libitum access to palatable food by taking small meals and adjusting intake according to the energy density of the food(s) available. The most extreme adaptations to carnivory discovered to date lie in the taste buds of the facial nerve, which are highly responsive to amino acids and unresponsive to many mono- and disaccharides. Preferences for particular foods can be modified by their relative abundance, their novelty, and by aversive consequences such as emesis: the mechanisms whereby these are brought about appear to be similar to those used by omnivorous mammals.

L6 ANSWER 8 OF 22 BIOSIS COPYRIGHT 2000 BIOSIS DUPLICATE 6
AN 1996:280497 BIOSIS
DN PREV199699002853
TI Thermal tolerance and heat shock protein synthesis during development in the anuran Lepidobatrachus laevis.
AU Carroll, Edward J. Jr.
CS Dep. Biol., Univ. California, Riverside, CA 92521 USA
SO Development Growth & Differentiation, (1996) Vol. 38, No. 1, pp. 9-14. ISSN: 0012-1592.
DT Article
LA English
AB Development of the Paraguayan anuran Lepidobatrachus laevis is unusual in that the larvae are **obligate carnivores**, facultative cannibals and apparently exist at high environmental temperatures in their natural habitat. In the present study, the effect of environmental temperature on the rate of anuran development was investigated. The larvae have a thermotolerance range of 18 degree C for normal development between 19 and 37 degree C. The effect of temperature on the rate of development was dramatic; larvae that were incubated at 36.8 degree C develop to stage 24 (Gosner) in approximately 9 h compared with 24 h for larvae incubated at 19 degree C. The ability of larvae to survive heat shock was also examined; larvae did not survive a shock of 45 degree C for 15 min when it was administered at stages 3, 5, 9, 10 or 20. However, using the same heat shock conditions, 50% survival was observed when larvae were shocked at stage 16. To study protein synthesis during heat shock, larvae were pulsed with (35S)-methionine during heat shock and labeled proteins were analyzed by electrophoresis under reducing and denaturing conditions. Larvae synthesized two sets of heat-shock proteins at doublet molecular weights of 83/78 and 62/59 kDa. These proteins were synthesized independently of the stage of development at which the shock was administered or the magnitude of the heat shock.

L6 ANSWER 9 OF 22 BIOSIS COPYRIGHT 2000 BIOSIS DUPLICATE 7
AN 1996:33839 BIOSIS
DN PREV199698605974
TI Risk assessment, life history strategies, and turtles: Could declines be prevented or predicted.
AU Burger, Joanna; Garber, Steven D. (1)
CS (1) Dep. Biol. Sci., Rutgers University, Piscataway, NJ 08855-1059 USA
SO Journal of Toxicology and Environmental Health, (1995) Vol. 46, No. 4, pp. 483-500. ISSN: 0098-4108.
DT Article
LA English
AB The process of ecological risk assessment should involve the ability to predict adverse outcomes of particular environmental contaminants or human intrusions. Ecological risk assessment generally focuses on populations, communities. and ecosystems, rather than on individual health. We explore the importance of life history strategies of aquatic turtles to their risk from environmental contaminants and other human activities using three examples: the wood turtle Clemmys insculpta, a freshwater species; the diamondback terrapin Malaclemys terrapin, a littoral species; and marine turtles as a group. These turtles are partly herbivorous and are at low or

intermediate levels on the food chain, yet are particularly vulnerable due to their life history strategies of being long-lived with relatively low survival of young. They suffer a variety of natural mortality factors that include predation, starvation, and disease, as well as inundation and destruction of nesting beaches and their eggs by storms. Yet they also face a number of anthropogenic hazards, including toxic chemicals and floatables (plastics; capture for food, other products, and pets; incidental mortality in fishing gear; disturbance while nesting or moving on land, injuries or death by collision with boats; and increased predator exposure because of humans. The three turtle species (or groups of species, examined have experienced these natural and anthropogenic pressures differentially, with resultant differences in the rates of population declines. Because they are lower on the food chain than other **obligate carnivores**, they are less vulnerable to toxics, and to date, toxics seem a relatively inconsequential environmental risk to turtles.

L6 ANSWER 10 OF 22 AGRICOLA DUPLICATE 8
AN 95:60061 AGRICOLA
DN IND20480995
TI Differences between cats and dogs: a nutritional view.
AU Lowe, B.; Markwell, P.J.
CS Waltham Centre for Pet Nutrition, Waltham-on-the-Wolds, Melton Mowbray, Leicestershire.
AV DNAL (QL55.I5)
SO Animal technology : journal of the Institute of Animal Technicians, Apr 1995. Vol. 46, No. 1. p. 29-35
Publisher: [Sussex] : The Institute.
ISSN: 0264-4754
NTE Includes references
CY England; United Kingdom
DT Article
FS Non-U.S. Imprint other than FAO
LA English
AB Although both dogs and cats belong to the order Carnivora, the dog has evolved as an omnivore whereas the cat is an **obligate carnivore**. The following are examples of the nutritional peculiarities of the cat, which demonstrate its dependency on at least some animal-derived tissue in the diet: The cat has a higher protein requirement than the dog due to an inability to down-regulate the level of activity of amino-acid catabolising enzymes, even when fed a diet low in protein. The cat is particularly susceptible to a deficiency of the amino acid, arginine. The cat has a specific dietary requirement for the amino sulphonic acid, taurine, since it is unable to synthesise enough to meet its high physiological needs. Taurine is only found in appreciable quantities in materials of animal origin. A dietary source of pre-formed vitamin A, which is found only in animal tissue, is required by the cat, since it cannot convert beta-carotene to the active vitamin. The cat cannot convert sufficient linoleic acid to arachidonic acid to meet its requirements, and a dietary source of arachidonic acid (found only in animal tissue) is required. A further example of the nutritional specialisation of the cat is its higher requirement for niacin, because it cannot convert sufficient tryptophan to niacin to meet its needs. An unusual active pathway in tryptophan metabolism is favoured, which may reflect a protective mechanism against the potentially toxic effects of a high intake of tryptophan resulting from a carnivorous diet.

L6 ANSWER 11 OF 22 CABA COPYRIGHT 2000 CABI DUPLICATE 9
AN 95:76245 CABA
DN 951403241

TI Differences between cats and dogs: a nutritional view
AU Legrand-Defretin, V.
CS Waltham Centre for Pet Nutrition, Waltham-on-the-Wolds, Melton Mowbray LE14 4RT, UK.
SO Proceedings of the Nutrition Society, (1994) Vol. 53, No. 1, pp. 15-24. 48
ref.
ISSN: 0029-6651
DT Conference Article; Journal
LA English
AB The nutritional requirements of cats and dogs are reviewed and it is maintained that cats show a specialization consistent with the evolutionary influence of a strict carnivorous diet, while diets of dogs show more variety. Examination of the protein, vitamin and essential fatty acids requirements and aspects of carbohydrate metabolism indicated the following cat specializations: limited ability to regulate amino acid catabolic enzymes; lower capacity to synthesize taurine; insufficient synthesis of nicotinic acid from tryptophan; inability to convert carotene to retinol; inability to convert sufficient linoleic acid to arachidonic acid; inability to cope with high levels of carbohydrate in the diet. It is concluded that the cat, unlike the dog, is an **obligate carnivore** and is dependent on at least some animal-derived materials in its diet.

L6 ANSWER 12 OF 22 BIOSIS COPYRIGHT 2000 BIOSIS DUPLICATE 10
AN 1993:408095 BIOSIS
DN PREV199396073820
TI Squirrels as predators.
AU Callahan, J. R.
CS Box 3140, Hemet, CA 92546 USA
SO Great Basin Naturalist, (1993) Vol. 53, No. 2, pp. 137-144.
ISSN: 0017-3614.
DT Article
LA English
AB A literature review and field observations indicate that most sciurids are facultative predators on small vertebrates. This behavior is documented for at least 30 sciurid species in S genera. The frequency of predation apparently is influenced by various factors including climate, season, gender, reproductive condition, and availability of plant sources for certain nutrients such as calcium and nitrogen. Although sciurids assimilate as much energy from animal foods as do **obligate carnivores**, behavior associated with predation appears to be less efficient in sciurids and may rely partly on prey habituation and other adaptive behaviors.

L6 ANSWER 13 OF 22 AGRICOLA DUPLICATE 11
AN 92:58649 AGRICOLA
DN FNI92001659
TI Protein requirements of adults from an evolutionary perspective.
AU Carpenter, K.J.
CS University of California, Berkeley, CA
AV DNAL (389.8 J824)
SO American journal of clinical nutrition, May 1992. Vol. 55, No. 5. p. 913-917
Publisher: Baltimore, Md. : American Society for Clinical Nutrition.
CODEN: AJCNAC; ISSN: 0002-9165
Target Audience: Specialized
NTE Literature review.
Includes references.
DT Article; (SURVEY OF LITURATURE)
FS U.S. Imprints not USDA, Experiment or Extension
LA English

AB It is argued that the observed minimum needs for protein and individual amino acids by adult humans and animals may merely reflect the diet that their predecessors consumed in the course of their evolution. The ability to adapt to diets with a lower proportion of protein than was ever encountered in practice would have given no competitive advantage. This can explain the limited ability to reduce rates of amino acid catabolism. The protein requirement of domestic cats, **obligate carnivores**, corresponds to approximately 20% of their energy requirement. Humans adapt to lower levels (approximately 6%). Some urge that higher protein intakes, resulting in higher rates of protein synthesis and turnover, are desirable and that, in general, the more prosperous and successful groups eat more protein. But cause and effect may be reversed. Are higher rates of turnover and catabolism necessarily beneficial? Objective data are still not available.

L6 ANSWER 14 OF 22 BIOSIS COPYRIGHT 2000 BIOSIS
AN 1989:512709 BIOSIS
DN BA88:128852
TI A COMPARISON OF MEAL SIZE AND FEEDING RATE OF THE LYSIANASSID AMPHIPODS ANONYX-NUGAX ONISIMUS-LITORALIS AND ORCHOMENELLA-PINGUIS.
AU SAINTE-MARIE B; PERCY J A; SHEA J R
CS INST. MAURICE-LAMONTAGNE, PECHES ET OCEANS, 850 ROUTE DE LA MER, C.P. 1000, MONT-JOLI, QUEBEC G5H 3Z4, CAN.
SO MAR BIOL (BERL), (1989) 102 (3), 361-368.
CODEN: MBIOAJ. ISSN: 0025-3162.
FS BA; OLD
LA English
AB Lysianassid amphipod were collected in 1987 from Frobisher Bay, Baffin Island, and from the Mingan Archipelago, Gulf of St Lawrence. Meal size and feeding rate of Anonyx nugax (Phipps), Onisimus (= Pseudalibrotus) litoralis (Kroyer) and Orchomenella pinguis (Boeck) were estimated directly, gravimetrically and/or from predictive equations. Size-specific ingestion was greatest in A. nugax, which fed swiftly and efficiently in comparison to O. litorais and O. pinguis. These two latter species dispersed some bait while feeding and crawling on its surface. Groups of lysianassids fed more wastefully than single individuals. Meal size of females of O. litoralis decreased with increasing maturity, while berried females of O. pinguis consumed less food than mature males. Up to 30 d of starvation had no effect on survival and feeding ability of A. nugax, but 10 to 15 d of starvation dramatically reduced feeding ability or killed O. litoralis and O. pinguis. Differences between meal size, feeding rate and survival point to divergent feeding patterns, which also have been evidenced elsewhere by analysis of gut contents. O. litoralis and O. pinguis are best characterized as facultative scavengers, while large A. nugax are possibly **obligate carnivores**. Results emphasize the importance of lysianassid amphiphods, particularly A. nugax, as bait sealers and as predators of commercial aspects trapped by various fishing gear.

L6 ANSWER 15 OF 22 BIOSIS COPYRIGHT 2000 BIOSIS
AN 1988:437118 BIOSIS
DN BA86:89216
TI THE OBLIGATE CARNIVOROUS LARVAE OF THE FROG LEPIDOBATRACHUS-LAEVIS LEPTODACTYLIDAE.
AU RUIBAL R; THOMAS E
CS DEP. BIOL., UNIV. CALIFORNIA, RIVERSIDE, CALIF. 92521.
SO COPEIA, (1988) 1988 (3), 591-604.
CODEN: COPAAR. ISSN: 0045-8511.
FS BA; OLD
LA English
AB The larval morphology and captive breeding of Lepidobatrachus laevis (Leptodactylidae, Ceratophryinae) from the Paraguayan Chaco is described.

The larvae are **obligate carnivores** that swallow large, living prey whole. The larva has a large dorsoventrally flattened head with a beakless wide mouth. By means of buccal suction they can ingest tadpoles that are nearly equal to themselves in size. The chondrocranial cartilages are simple in comparison to microphagous larvae, and the chondrocranium is wider than long. Larval development is rapid, and some tadpoles reach metamorphosis in 20 d. The brachial chambers are like those of Type IV (Orton, 1953) larvae, but the paired branchial openings are lateral and different from the spiracles of other anuran larvae. The branchial chambers show asymmetrical development with the opercular fold closing the right branchial openings prior to the formation of the branchial opening. The right branchial chamber reopens and the fully developed larva has two large symmetrical branchial openings. The digestive tract is adult-like and the stomach has a large fundic portion that distends to accept the large prey, a typical muscular pyloric region and sphincter, and a short intestine less than 2.times. the SVL of the larva. In many of its characteristics the larva of Lepidobatrachus resembles the adult.

L6 ANSWER 16 OF 22 BIOSIS COPYRIGHT 2000 BIOSIS DUPLICATE 12
AN 1989:106429 BIOSIS
DN BR36:51845
TI A MICROSCOPIC EXAMINATION OF THE FOREGUT OF LARVAL LEPIDOBATRACHUS **OBLIGATE CARNIVORES**.
AU JUSTIS S; PEPPERS T; WOLFE C; HINES A
CS POINT LOMA NAZARENE COLL., SAN DIEGO, CALIF. 92106.
SO ANNUAL MEETING OF THE AMERICAN SOCIETY OF ZOOLOGISTS, AMERICAN MICROSCOPICAL SOCIETY, ANIMAL BEHAVIOR SOCIETY, THE CRUSTACEAN SOCIETY, INTERNATIONAL ASSOCIATION OF ASTACOLOGY SOCIETY OF SYSTEMATIC ZOOLOGY, AND THE WESTERN SOCIETY OF NATURALISTS, SAN FRANCISCO, CALIFORNIA, USA, DECEMBER 27-30, 1988. AM ZOOL. (1988) 28 (4), 67A.
CODEN: AMZOAF. ISSN: 0003-1569.
DT Conference
FS BR; OLD
LA English

L6 ANSWER 17 OF 22 CABA COPYRIGHT 2000 CABI
AN 90:96093 CABA
DN 901425861
TI Nutrition and the clinician: nutritional requirements of the dog and cat
AU Studdert, V. P.
CS Department of Veterinary and Clinical Science, University of Melbourne, Werribee, Victoria 3030, Australia.
SO Publication - Veterinary Continuing Education, Massey University, (1988) No. 119, pp. 49-65. 7 ref.
ISSN: 0112-9643
DT Journal
LA English
AB The cat is both physiologically and behaviourally an **obligate carnivore**, whereas the dog can exist on omnivorous diets, perhaps marking adaptation to domestication. The nutrition of the dog and cat is discussed, noting the major and minor nutritional requirement differences between the two species brought about by those differing feeding characteristics. Tables are given for the nutrient requirements with accompanying explanatory notes.

L6 ANSWER 18 OF 22 CABA COPYRIGHT 2000 CABI DUPLICATE 13
AN 88:5638 CABA
DN 881402839
TI The importance of essential fatty acid evaluation and supplementation in feline diets
AU Davidson, B. C.; Traher, C. S.
CS Dep. Medical Biochemistry, Univ. Witwatersrand Medical School, York Road,

2193 Parktown, South Africa.
SO Journal of the South African Veterinary Association, (1987) Vol. 58, No. 1, pp. 39-41. 12 ref.
ISSN: 0038-2809
DT Journal
LA English
AB Certain felines are **obligate carnivores** because they lack fatty acid desaturase. Processing and pelleting of feed can destroy the essential fatty acid (EFA) potency. Therefore supplementation of the diet with oils rich in EFA should be considered and also the possibility of EFA deficiency among domestic carnivores.

L6 ANSWER 19 OF 22 BIOSIS COPYRIGHT 2000 BIOSIS
AN 1985:286273 BIOSIS
DN BA79:66269
TI A BIRD COMMUNITY OF LOWLAND RAINFOREST IN NEW-GUINEA 6. FORAGING ECOLOGY AND COMMUNITY STRUCTURE OF THE AVIFAUNA.
AU BELL H L
CS DEP. ZOOLOGY, UNIV. NEW ENGLAND, ARMIDALE, NSW 2351.
SO EMU, (1984) 84 (3), 142-158.
CODEN: EMUUAI. ISSN: 0374-7441.
FS BA; OLD
LA English
AB The foraging ecology and community structure of 83 co-existing species at Brown River, Papua New Guinea, were analyzed. **Obligate carnivores**, mostly insectivorous, are much more diverse in foraging behavior than are facultative carnivores. Overlap between insectivorous species may be lower than in similar but depauperate communities in Australian rainforests. Herbivores are separated mostly by differences in weight. Carnivores do not conform to current theory on size-differences between co-existing congeners. The 2 opposing views, explaining the richness of tropical avifaunas, are both correct. For herbivores the abundance of resources permits wide overlaps between species. For carnivores the complex habitat permits many species to co-exist by finely dividing the habitat.

L6 ANSWER 20 OF 22 SCISEARCH COPYRIGHT 2000 ISI (R)
AN 81:251584 SCISEARCH
GA The Genuine Article (R) Number: LR435
TI ARE ESKIMOS **OBLIGATE CARNIVORES**
AU SINCLAIR H (Reprint)
CS INT INST HUMAN NUTR, SUTTON COURTENAY OX14 4AW, OXFORDSHIRE, ENGLAND (Reprint)
CYA ENGLAND
SO LANCET, (1981) Vol. 1, No. 8231, pp. 1217.
DT Letter; Journal
FS LIFE; CLIN
LA ENGLISH
REC Reference Count: 6

L6 ANSWER 21 OF 22 CAPLUS COPYRIGHT 2000 ACS DUPLICATE 14
AN 1981:495939 CAPLUS
DN 95:95939
TI Are Eskimos **obligate carnivores**?
AU Gibson, R. A.; Sinclair, A. J.
CS Dep. Paediatr., Flinders Univ., Bedford Park, 5042, Australia
SO Lancet (1981), 1(8229), 1100
CODEN: LANCAO; ISSN: 0023-7507
DT Journal
LA English
AB The fatty acids of plasma and dietary lipids were studied in Greenland and
Danish Eskimos. The plasma lipids were low in arachidonic acid (C20:4.omega.6) and high in C20:3 relative to C20:4.omega.6. Dietary lipids were high in .omega.3 long chain polyunsaturates (LCP.omega.3) and

low in .omega.6 fatty acids. In Danish Eskimos tissue and dietary LCP.omega.3 fatty acids were negligible and plasma linoleic acid (C18:2.omega.6) was high. In both groups of Eskimos there was a high blood level of C20:3 relative to C20:4.omega.6. The most common C20:3 isomer was C20:3.omega.6, which, in Europeans and Americans, is usually low relative to C20:4.omega.6. These results suggest that Eskimos have little or no .DELTA.5 or .DELTA.6 desaturase activity, and that they require the LCPs present only in animal or fish lipids, for incorporation into membranes and prostaglandins.

L6 ANSWER 22 OF 22 BIOSIS COPYRIGHT 2000 BIOSIS
AN 1981:188420 BIOSIS
DN BA71:58412
TI FEEDING ECOLOGY OF LAGODON-RHOMBOIDES PISCES SPARIDAE VARIATION AND FUNCTIONAL RESPONSES.
AU STONER A W
CS HARBOR BRANCH INST., INC., R.R. 1, BOX 196-A, FT. PIERCE, FLA. 33450.
SO U S NATL MAR FISH SERV FISH BULL, (1980) 78 (2), 337-352.
CODEN: FSYBAY. ISSN: 0090-0656.
FS BA; OLD
LA English
AB Five major ontogenetic stages were found in the diet of pinfish, L. rhomboides, from Apalachee Bay, Florida [USA], but diet and dietary breadth showed high degrees of variation with space (both local and geographic), and seasonal variation within size classes was often as dramatic as ontogenetic variation. L. rhomboides demonstrated planktivory, omnivory, strict carnivory and strict herbivory at different times, places and development stages. Ontogenetic pattern in food habits was primarily a function of mouth size and changing dentition of the predator. Until it reaches 35 mm standard length, the pinfish is an **obligate carnivore**. Spatial and temporal variation in the food habits of pinfish was a complex function of absolute and relative abundances of food items in the field. Changes in plant consumption by fish larger than 35 mm standard length may be due to changing plant abundance or protection of prey species by macrophyte cover at a given station. Since seagrass biomass and the functional role of a single predator vary over both space and time, plant-animal and predator-prey relationships change continually; the life history of L. rhomboides is well adapted to seasonal patterns of productivity in food organisms. Multi-dimensional variation in diets rendered the trophic level concept inoperational. Food webs are static neither in time nor in space and the taxonomic species may not be functional components in models of energetic pathways and predator-prey relationships.

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   5 FILES SEARCHED...
L1   1 OBLIGATE CARNIVORE# AND PROTEIN# AND CARBOHYDRATE# AND FAT#

=> d

L1   ANSWER 1 OF 1 CAPLUS COPYRIGHT 2000 ACS
AN   2000:157779 CAPLUS
TI   Method and composition to protect an **obligate carnivore**
     from a disease ofabnormal **carbohydrate** metabolism
IN   Hodgkins, Elizabeth A.
PA   Heska Corporation, USA
SO   PCT Int. Appl.
     CODEN: PIXXD2
DT   Patent
LA   English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2000011964	A1	20000309	WO 1999-US20171	19990901

        W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ,
            DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS,
            JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK,
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            TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD,
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            CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG
PRAI US 1998-98911   19980902

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(1) Allan, L; US 5792501 A 1998 CAPLUS
(2) Burkholder, W; JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION 1998,
V212(5), P658 MEDLINE
(3) Franca, L; EP 0421956 A 1991
(4) Iams Company; WO 9844932 A 1998
(6) Kettelhut, I; AMERICAN JOURNAL OF PHYSIOLOGY 1980, V239(5), PR437 CAPLUS

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